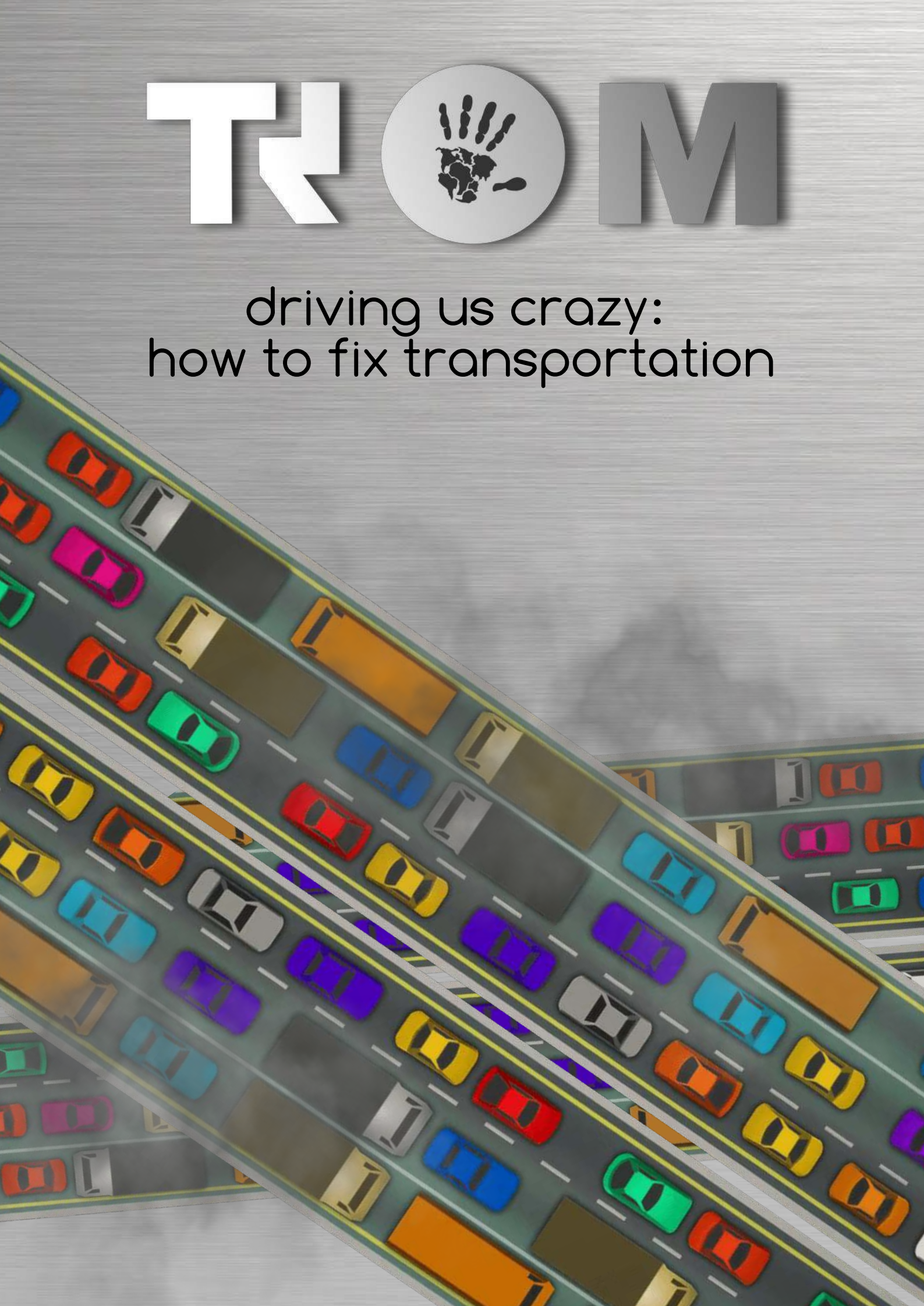
TRM

driving us crazy:
how to fix transportation



Author: Jennifer
Review: Tio
Proofread: Seb
Design: Tio
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Summary:

Driving is glamorized in every movie, television show, marketing promo, video game and even sports like nascar and F-1 racing. Most imagine themselves as carefree, untethered creatures cruising down an open road, wind in hair, perfect jams on the radio and stunning views as far as the eye can see. It’s no wonder humans are emotionally attached to these machines that take us just about anywhere we want to go.

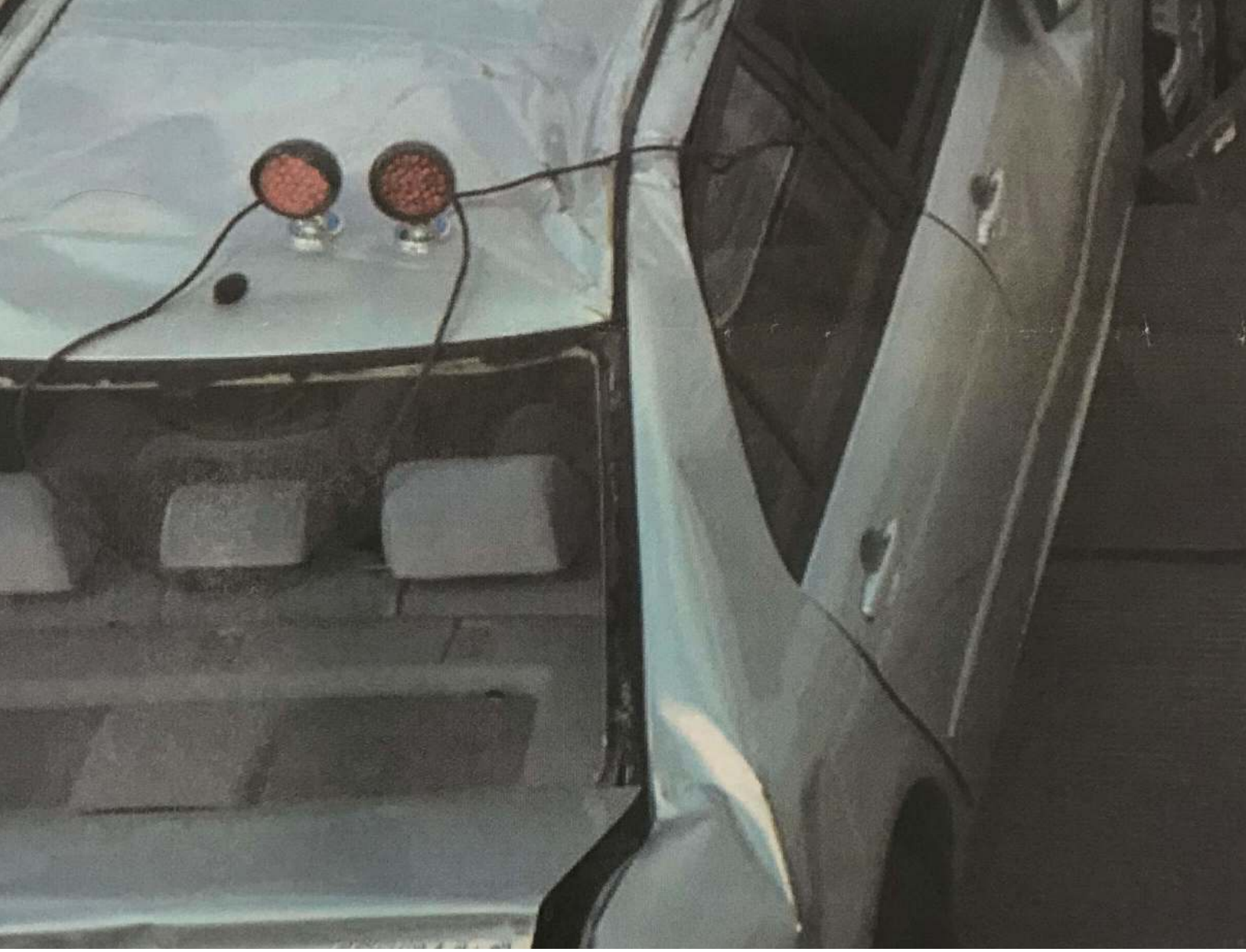
However, there is also a very grim and largely overlooked side to our current transportation system that they won’t show you in any glossy advert. One that creates many harmful problems and dangers for our species.

In spite of that, TROM project goes beyond pointing out the flaws and proposes realistic, viable solutions to everyday problems. Join us on this journey that goes far beyond the limits of our outdated, trade-based system and view the world of transportation with a whole new level of admiration that works for every inhabitant on planet earth.

About two years ago, while living in Austin, Texas, I was involved in a serious car accident.

This event changed my life in a number of ways and this led me to question the numerous impracticalities and dangers associated with our current transportation system. This event also inspired me to look for practical solutions to this complex subject. Obviously this is only one aspect of the many flaws of the insane, for-profit system that we live in today. Nonetheless, it is a very worthy topic to explore.

I will give you some background information about myself and how I arrived here - no pun intended ;)

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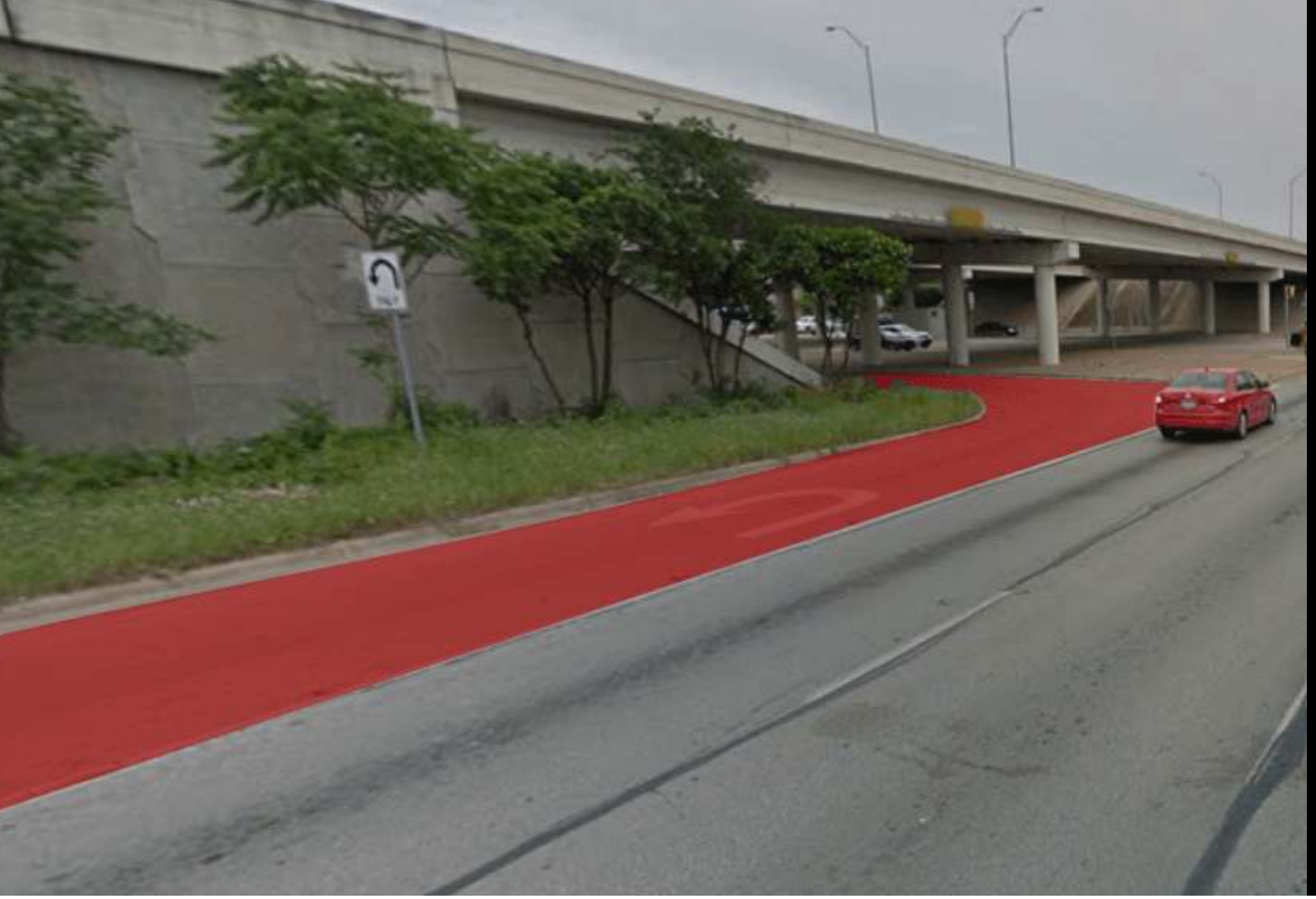
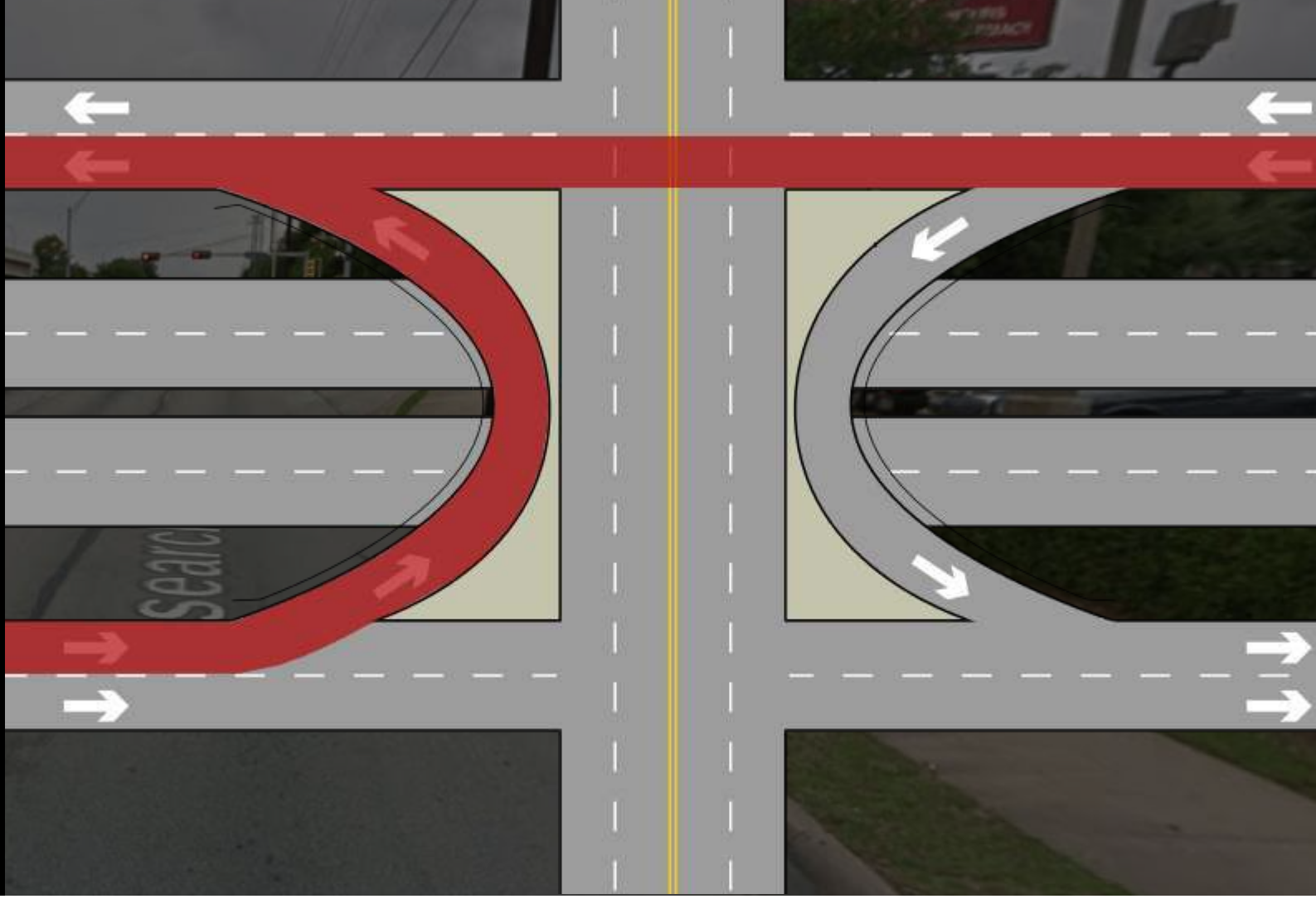


My morning started like any other. It was early and I was headed to work in a hurry, exhausted from the long work day before. My commute to work wasn't very far from my home, yet it was always a stressful one. This particular day, I didn't get very far. In fact, I only made it about a ¼ of a mile (0.4km) from my apartment when I crossed through a notoriously busy intersection as the light was changing from green to yellow. The roads in this area of the neighborhood have a confusing set up and it is quite dangerous considering that there are so many vehicles coming from many different directions at relatively high speeds. The speed limit for this strip of road is 45mph (72km/h).

The streets are all one way and they are three lanes wide. These are called "frontage roads" and they run parallel to the freeway. In order for someone to switch directions (change from north to south or vice versa) on the frontage road, they must get in the turnaround lane aka the "Texas U-turn", which makes a sharp left turn under the freeway overpass.



The turnaround lane does not have a traffic light, only a yield sign. So, it is up to the driver to judge accordingly, provided they can see properly and the driver is paying close attention. I was in the middle lane and in order to catch the light before it turned red, I sped up and got in the far left lane. At that moment, I could see a large pickup truck waiting in the turnaround lane. As I crossed through the intersection, traveling at about 50 mph (80km/h), the truck driver hastily decided to go and at that moment my life flashed before my eyes. I knew it was too late to stop on such short notice due to the velocity of my car bee lining to catch the light and the fact that the driver of the truck was accelerating quickly, trying to cut me off at the last second. Sure enough, our vehicles collided. I ricocheted off his truck and this sent my car flying. I was driving a small compact vehicle and it was no match for his oversized truck. My car flipped and it landed upside down. This was a terrifying experience to say the least.

I held a huge grudge against the driver of the truck that hit my car for quite some time but then I realized, it was not his intention to hit me. Maybe he misjudged or was groggy or distracted.

Up until this event, I was like the majority of the drivers on the roads, simply blaming other drivers rather than the poorly designed infrastructure and the massive volume of vehicles. Before my car accident I had no clue how common these types of collisions were; It never even occurred to me how many people die in vehicle related accidents every day.

IN 2015, THE YEAR OF MY CAR ACCIDENT, THERE WERE A TOTAL OF 3,124 FATAL CRASHES RESULTING IN 3,516 DEATHS IN THE STATE OF TEXAS ALONE. THIS WAS THE HIGHEST ROAD MORTALITY RATES RECORDED IN THE UNITED STATES FOR THAT YEAR.

As a reminder to drivers, sort of a weak attempt to promote “safe” driving, the state keeps tally of the road related deaths for the year via electronic signs all along their poorly designed highways.

YET DOES NOTHING TO ACTUALLY PREVENT THESE FATALITIES FROM HAPPENING.

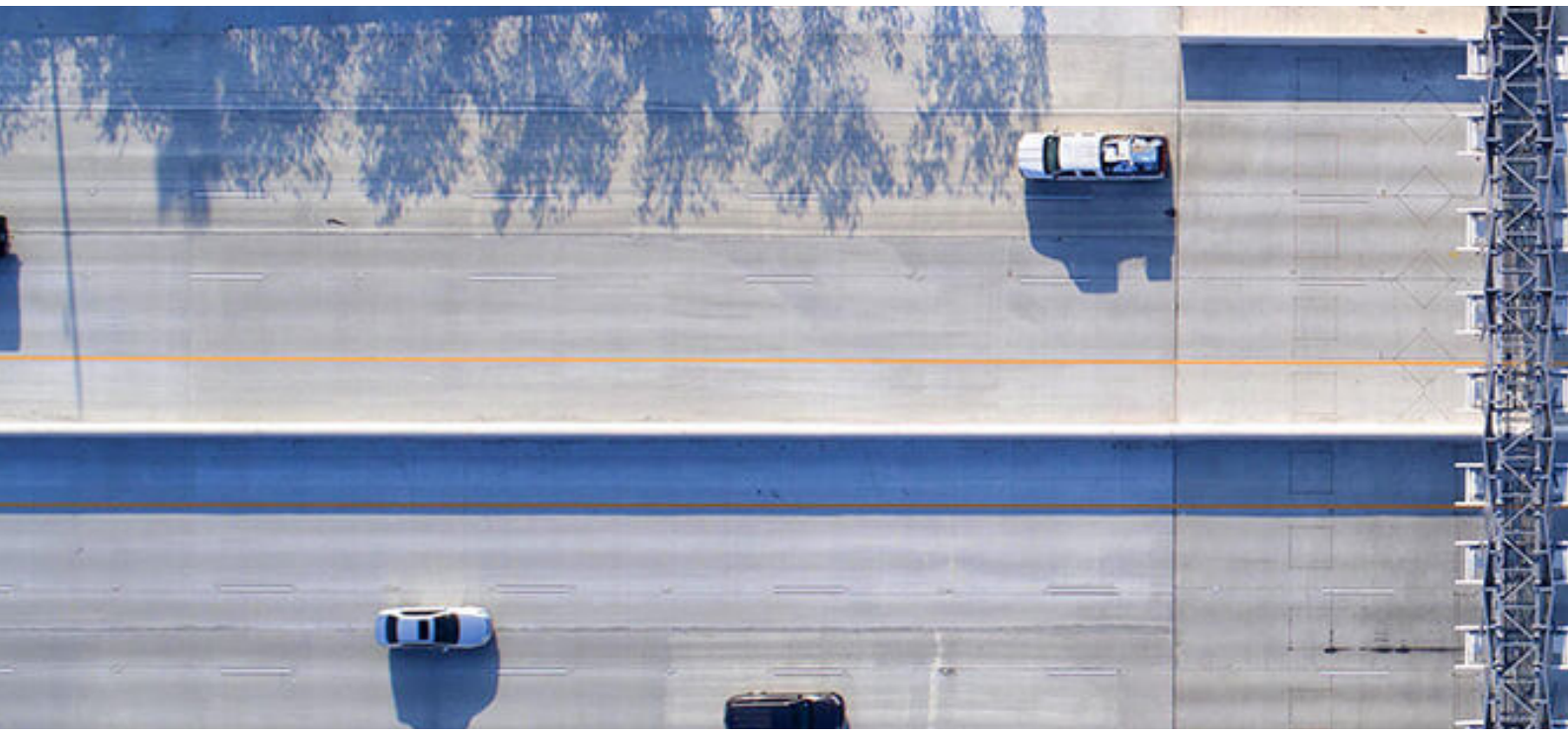
The state of Texas' main priority when it comes to the "improvement" of their roadways is the privatization of them.

Toll operated roads have been around since the 7th century. This began when the 'leader' of a tribe decided that all travelers who pass on foot, wagon, or horseback must pay him a fee (toll) for the use of certain roads. Today, most toll roads globally, are state enterprise (partially or fully owned by the government). This means that either the state "rents" the road to private enterprise and they collect fees on behalf of the state, the state operates and collects fees on their own, or construction and operation of newly built toll roads are delegated to private enterprise in return for shares (a portion of the profits) until their contract runs out.

In a situation where private enterprise is involved, investors are granted the right to raise and collect toll prices to whatever amount they like - this can lead to billions of dollars in profits for private investors.

All of the toll roads I have ever driven on still follow the same confusing, overly complex, and unsafe system that was introduced in the mid 1950's except they're maxed out supersized versions with millions upon millions of vehicles. One example, the High Five Interchange, which is a massive, chaotic highway that consist of two different toll roads. There are numerous problems with this type of setup, such as: crisscrossing traffic when entering or exiting the freeway, merging lanes or a sudden reduction of lanes, U-turn lanes without traffic lights, confusing or vague signs, stop signs on the freeway, intersecting traffic, sharp bends, constant construction lanes, police pulling people off onto the shoulder to hand out tickets and all of this is occurring at high speeds of 65-90 mph/105-145 km/h, on average. This is incredibly dangerous. The central expressway (US HWY 75) and LBJ (I-635) aka the High Five Interchange has been listed as one of the most dangerous intersections by TxDot (Texas Department of Motor Vehicles). (source) Also, locals have voiced their concern about feeling unsafe and generally dissatisfied while driving on these massive highways.

Toll roads are sprouting up all over the state of Texas. In most cases, the road suddenly switches from being a free road to a paid road with little to no notice. Oftentimes you're forced to drive through at least one to two tolls before you can exit onto the feeder road. If you fail to pay the toll fees they will turn into violations and the violations will turn into fines - multiplying over time. Also, your vehicle registration will be blocked, your car may be seized by the state and this may lead to court appearances or jail time. Which is what happened to one woman in Dallas, TX who racked up $14,000 in fees and fines. After missing a court hearing in regards to her outstanding toll bills she ended up with an overnight stay in jail.(source)



From my own personal experience, after living in Austin, TX for 4 years, I have been 'guilty' of failing to pay on time on multiple occasions. It is quite easy to do because there are several different companies that operate in the same region, they usually bill you a month or two after you drove on the road, and within the same company you will have multiple accounts. So, if you log in online to check your payment history it will not link up with the other account that they have for the same vehicle, under the same license plate and name within the same company.

It is extremely confusing and very hard to keep track of. The state claims that the fees collected are to maintain these roadways. However, many of the "improvements" on Texas toll roads are purely for aesthetic design, such as: adding fancy decals, murals, LED light displays, and decorative paint to the pillars and walls. In reality, most of the funds generated from toll fees go to pay off long-term debt from financing these roads and also, to build more toll roads (source 1, 2). Very little money goes toward improvements. Adding state of the art safety measures costs a lot of money and private investors do the bare minimum in terms of maintenance in order to increase profits.

In fact, a recent quality assurance review found that American highways are deteriorating faster than expected due to poor upkeep. (source) High interest rates on the loans borrowed by the city, state or country to build these roads are impossible to pay off. If we look at China, the country with the most toll operated roads in the world, over 400 billion yuan ($60 billion usd) is collected yearly but operating costs are 729 billion yuan - this mainly goes toward the interest of the loans for the roads. **Currently, China is in debt to private toll road investors to the sum of 4.45 trillion yuan.**

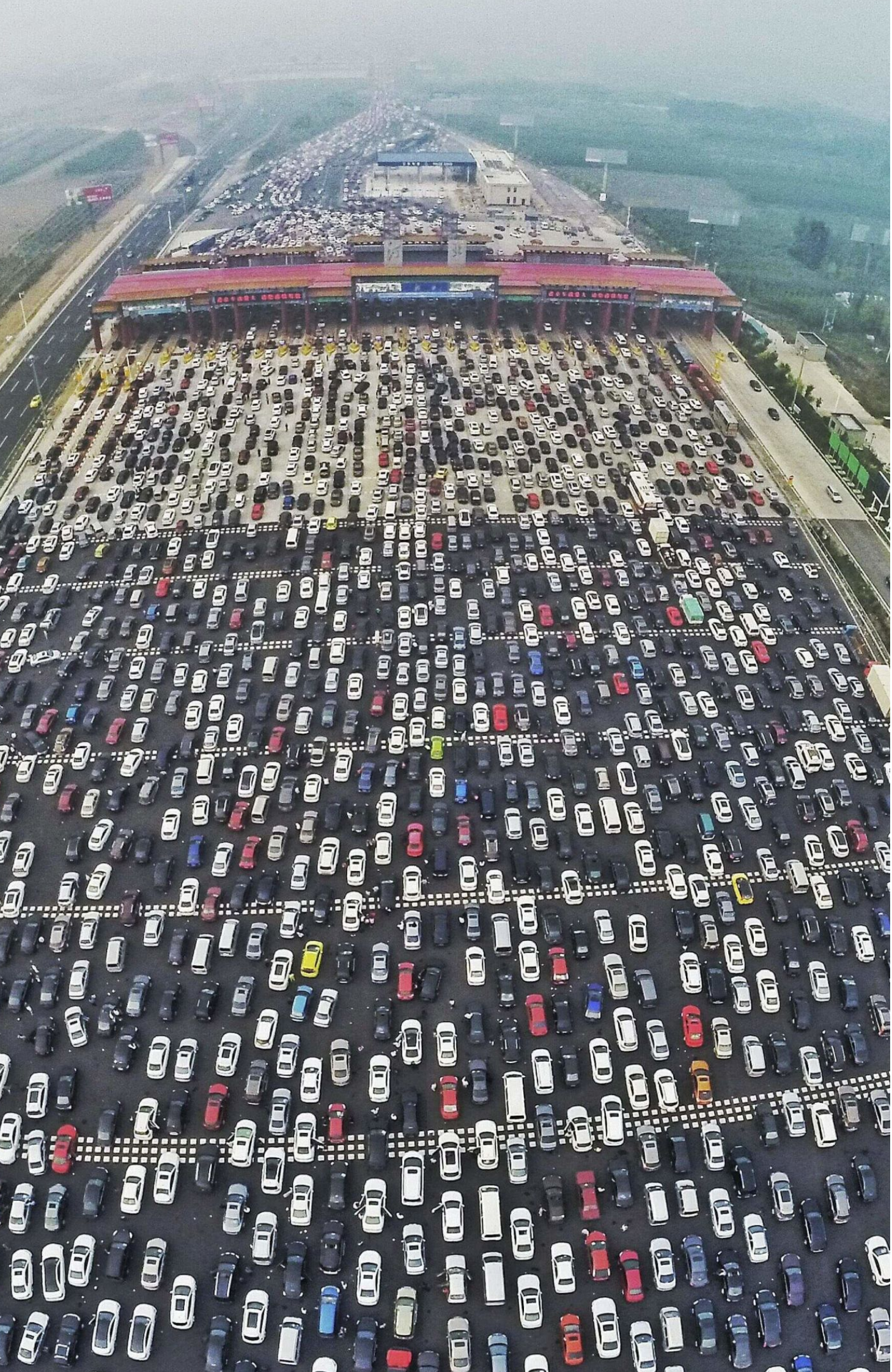
Another inefficient Texas toll road is the Katy freeway. After expanding this massive road to 26 lanes, it caused an even bigger slow down during rush hour commutes.

ON AVERAGE, AN EXTRA 50 MINUTES WAS ADDED TO THE FREEWAY DRIVERS' DAILY COMMUTE; ULTIMATELY WASTING (OVER) 25 MILLION HOURS OF COMMUTER TIME A YEAR.(SOURCE)

THIS IS A FORM OF INDUCED DEMAND. BASICALLY IF THE AMOUNT OF ROADS INCREASE THEN TRAFFIC WILL EQUALLY INCREASE.

An infamous toll road in China, the G4 Beijing - Hong Kong - Macau Expressway, experienced one of the world's worst traffic jams in 2015 after a toll booth was introduced (source).

THOUSANDS OF TRAVELERS, RETURNING FROM A NATIONWIDE HOLIDAY HIT A CHECKPOINT WHERE 50 LANES SUDDENLY MERGED INTO 20 AFTER DRIVERS EXITED THE TOLL BOOTHS. THIS CAUSED A MASSIVE SLOW DOWN THAT LEFT DRIVERS STRANDED FOR HOURS ON END.



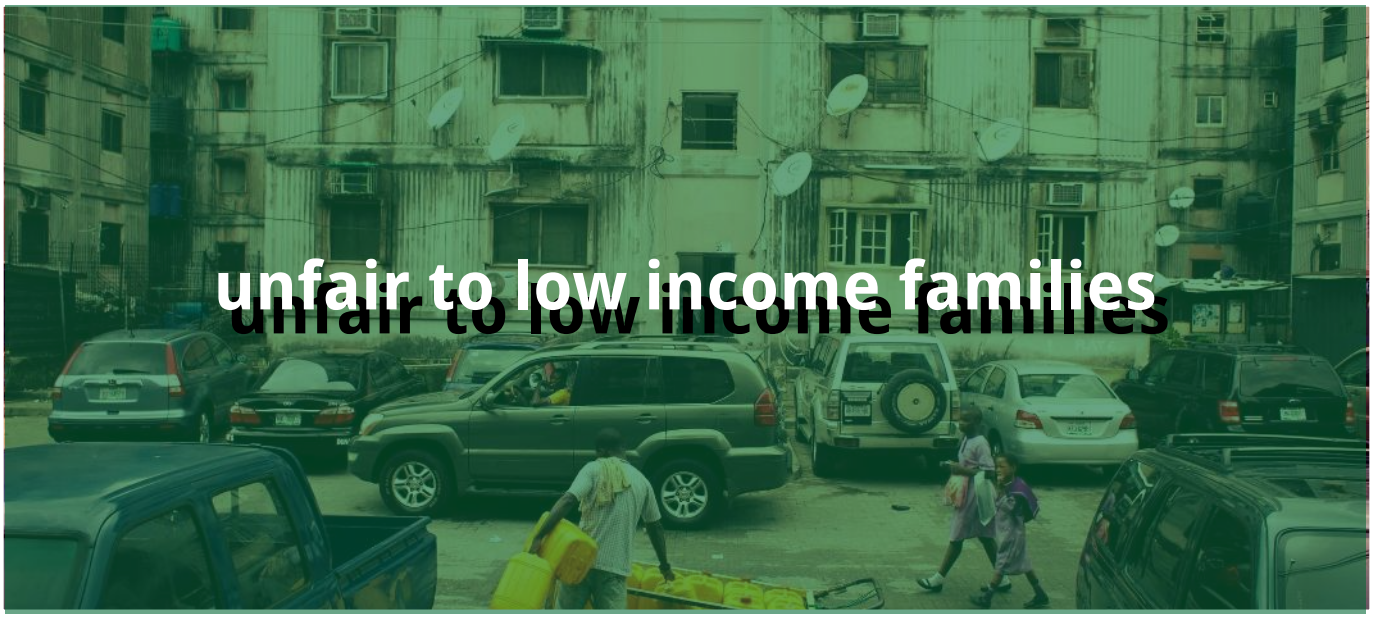
An even worse incident happened in Indonesia at the East Brebes Toll . This is similar to what happened in China. A large population of the country was en route to celebrate a national holiday when massive amounts of traffic caused a huge congestion that some say lasted for 35 hours.

THIS TERRIBLE INCIDENT CAUSED BETWEEN 12 TO 18 CASUALTIES OVER A FEW DAYS PERIOD DUE TO EXCESSIVE HEAT AND LACK OF RESOURCES WHILE STRANDED, AND BECAUSE AMBULANCES COULDN'T GET TO THESE PEOPLE IN TIME.

While this traffic is always bad during the holiday season, since so many are traveling at the same time, the toll booths made it catastrophic because they weren't capable of handling that volume of motorists all at once.


BREBES TIM

Several groups are popping up all over the world, protesting toll operations. One group, based out of the U.K. called National Alliance Against Tolls lists the major reasons they oppose toll roads, such as:



I think it is safe to say that this is not the way of the future but rather another way to keep us locked in this outdated, trade based system. The TROM ebook – "The Money Game and Beyond" covers this topic in detail.

...and other various reasons.

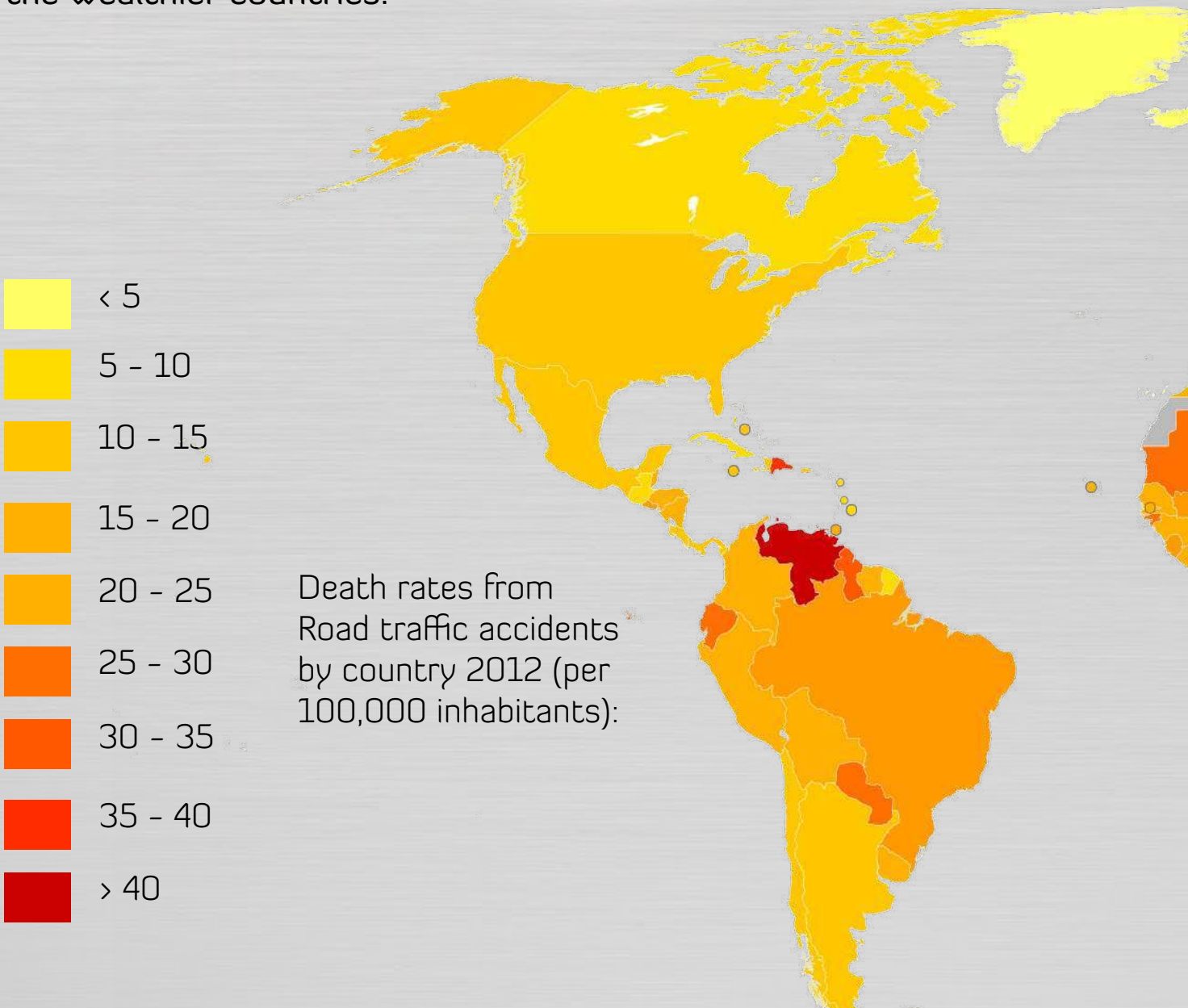
Safety must be one of our top priorities when designing new roads and transportation infrastructure. If we take a look at the death toll on the roads worldwide the numbers are quite staggering. Shockingly, auto traffic fatalities are the leading cause of death amongst young people (ages 15-29) and the 9th leading cause of death amongst all people, globally.

At this rate it is predicted to become the 5th leading cause of death by 2030. Not to mention the estimated 50 million people who suffer from serious injuries and life-long impairments every year!

To give you an idea, 50 million people is the entire population of Columbia.

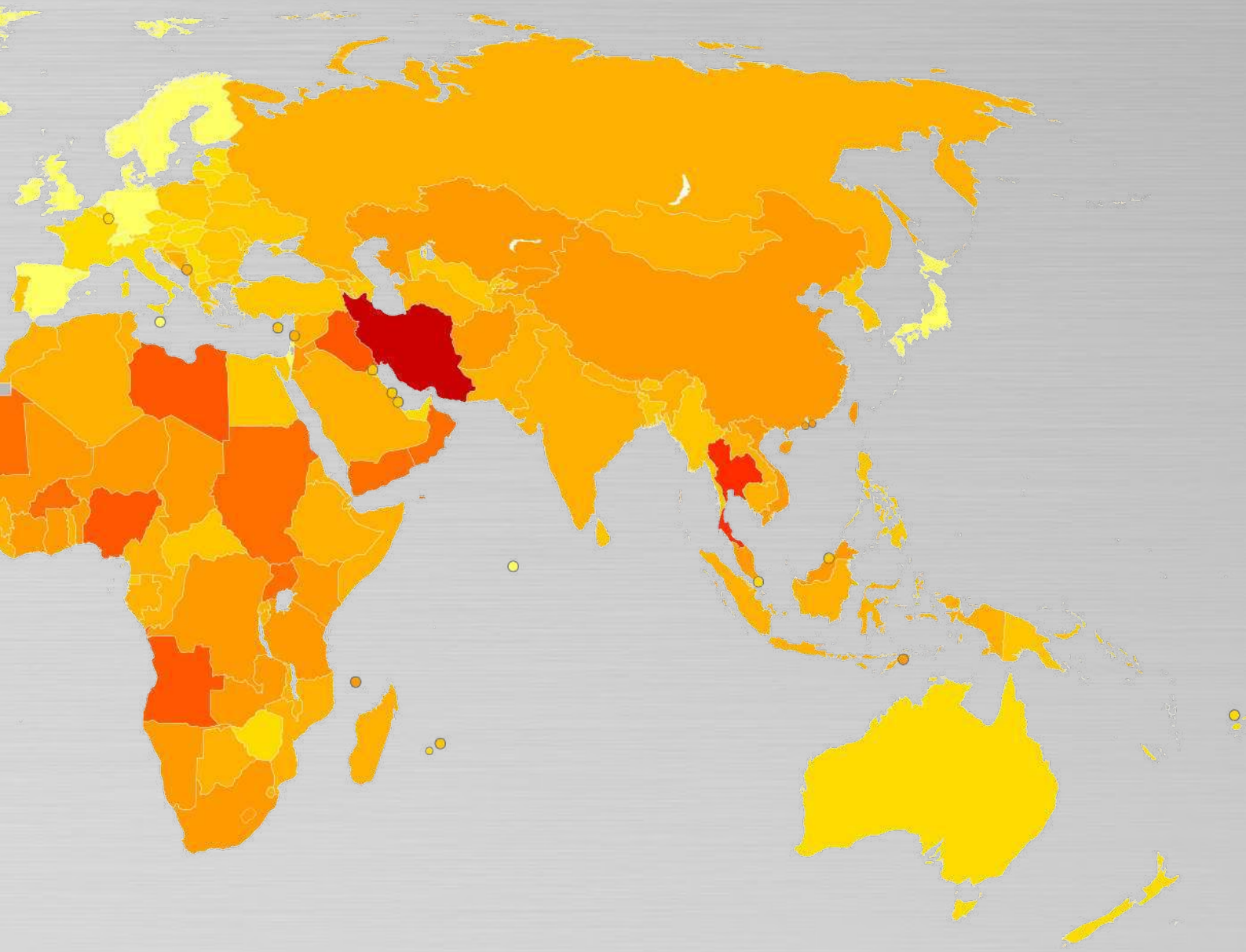
ANOTHER ALARMING STATISTIC - 90% OF AUTOMOBILE FATALITIES HAPPEN IN THE POOREST NATIONS.(SOURCE)

Due to "economic growth" in low-middle income countries motorization has increased.(source) This means that there is generally more transportation needed for the movement of resources and more people need to get back and forth for their jobs and this leads to more vehicles on the roads. The World Health Organization states that the difference between death rates in high versus low income countries is dramatically disproportionate with the low income countries having the highest amount of vehicle related deaths. Yet, the poorer countries have a significantly less amount of vehicles on the roads in comparison to the wealthier countries.



Let's take a moment to think about that. If poorer countries have disproportionately high levels of vehicular death rates, yet have less vehicles on the roads, why are they at higher risk? In addition the WHO states: "Although road traffic injuries have been a leading cause of mortality for many years, most traffic crashes are both predictable and preventable."(source)

Geez! Then why are they still occurring?! The WHO suggests that a lack of laws and enforcement is mainly to blame. Let's pause on that for a moment. Regardless of the amount of laws that are in place, if people are lacking resources like safe infrastructure, vehicles with important safety features and so on, then these fatalities will continue to happen. Furthermore, if strict laws were enforced on the car manufacturers, then they will likely find loopholes (as we see in many other circumstances) in order to maintain their cutting edge to maximize profits and stay in the trade game.



TRUTHFULLY, WHAT IS NEEDED IS EDUCATION AND AN EVEN DISTRIBUTION OF THE MOST UP TO DATE TECHNOLOGIES AND RESOURCES.

Most poor countries do not encourage their motorist to learn about safety and how to properly operate vehicles. If people understood why they need to wear seatbelts, helmets and use proper child restraints then strict laws would not be necessary.

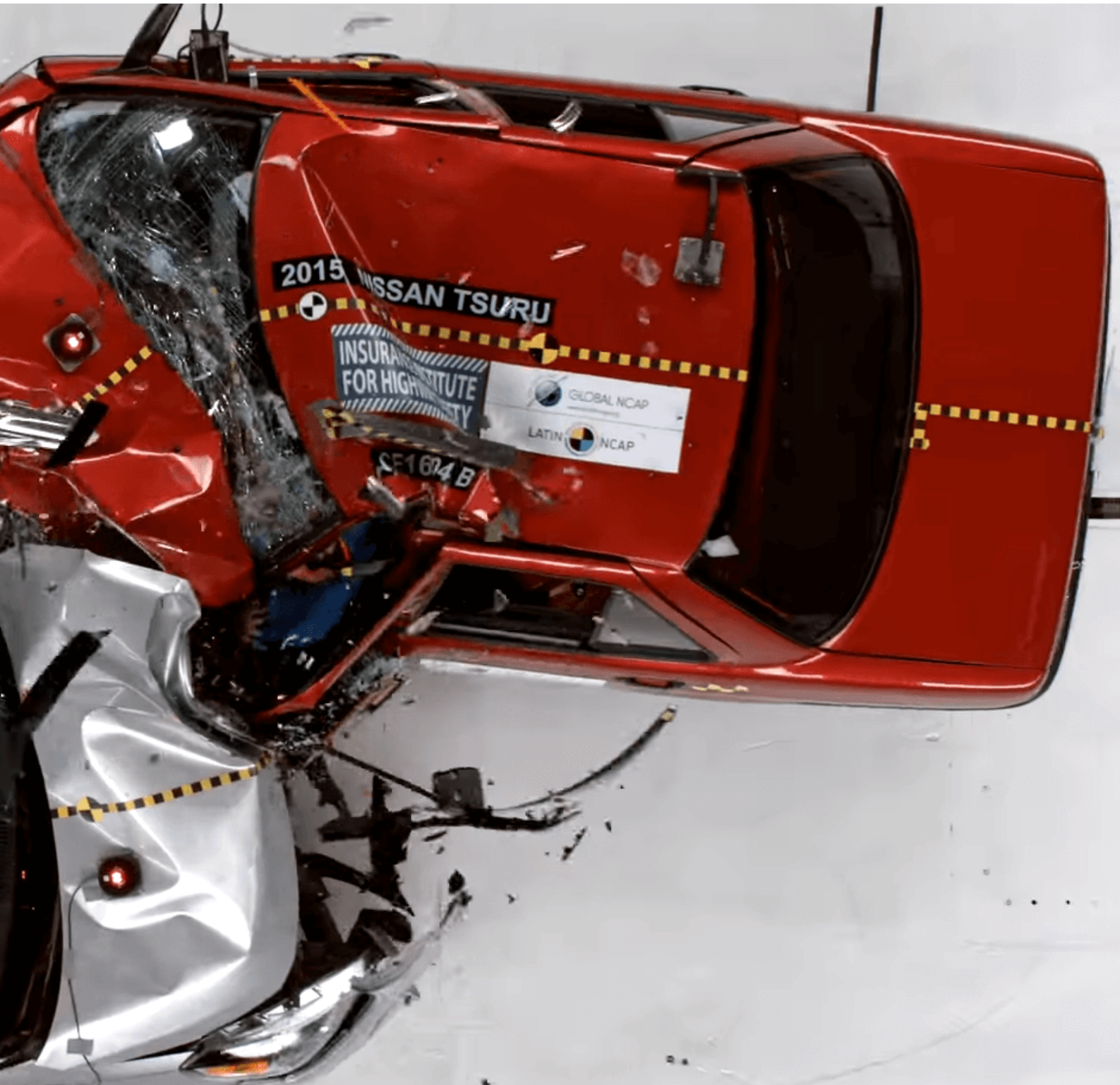

SOLOMON KALOU

Also, poorer nations are lacking paved roads, crosswalks, bike lanes, and proper traffic lights/signage.


CITY VIEW GROCERY
GENERAL MERCHANDISE & FRESH FOOD

To make matters worse, people in low-income countries are sold vehicles that fail to meet safety standards on all levels since it cuts costs for low income buyers and this is what they are able to afford. Generally, the "basic" version vehicles lack anti-lock braking systems and air bags.

In addition, basic models have underperforming seat belts and weaker body-shell structures. This saves automakers, at best, a few hundred dollars, which in turn means higher profits for them. Yet, it costs so many people their lives or it can greatly impair the quality of life for those that do survive near fatal crashes. These are things that you cannot put a price tag on.



Something else to consider is the lack of data, including detailed reports of accidents and fatalities at unsafe intersections. Without this crucial data it is difficult to know when and where to make necessary changes.

Also, poorer nations have less responsive, quality emergency care for those involved in serious accidents.


FUNDED BY FRENCH EMBASSY
St John
Ambulance

Another major safety issue is the style of driving.

Higher income countries tend to follow a homogeneous traffic style, where the majority of the vehicles on the road are similar in size and stay in single file lanes that all flow one way versus a heterogeneous traffic style with multiple types of vehicles with no clear lane markings or clear crosswalks for pedestrians.

Also, in poorer nations, most of the vehicles on the roads are two-wheelers because they are much more affordable.

However, these vehicles are much more dangerous since there isn't a protective shell, airbag or seat belt and in many cases the motorcycle/scooter is overloaded with passengers and cargo.


HONDA

ANOTHER MAJOR FACTOR THAT THE WHO NEGLECTS TO MENTION IS THE EVERYDAY STRESS THAT PEOPLE FROM LOW-MIDDLE INCOME REGIONS SUFFER FROM.

The constant anxiety about where your next meal will come from or how you will pay for housing, gas for your vehicle and many other stressful bills can be quite distracting. As I mentioned earlier, when I got into my car accident I was very stressed out, mainly from the lack of sleep and the long work hours that I kept. I'd basically spend my entire day at work - sometimes 10+ hours a day, not including travel time. After a while, this wears on you mentally and the drive to and from work becomes more and more difficult. Not because the route is challenging or filled with obstacles, but rather because I was generally in a groggy, cranky, and resentful state of mind and I had to force myself to show up at a job that I hated.

Those that work much longer hours in extreme and harsh conditions, traveling longer distances to and from work on unsafe routes, for far less pay with large families to care for must be under a tremendous amount of stress. That level of stress is very distracting and it will totally impair your judgement and make for really unsafe conditions on the roads; especially if the majority of the drivers on the roads are operating vehicles under these conditions.

Many travelers in poor countries risk their lives to transport themselves and cargo in dangerous

For example, in this video which takes place in the Democratic Republic of Congo (DRC), one of the poorest nations in the world, a 404 mile (650 km) trip, which normally takes travelers in this region 4 days in decent conditions, ends up taking these Congolese travelers 1 month because the road conditions are so incredibly bad. To put this into perspective, a 404 mile trip would take me about 5-6 hours to complete given the road/traffic conditions here and my mode of transportation.

Their truck is overloaded with goods forcing some of the passengers, who pay large sums of money ($20 usd or 17 euros) to board the truck, to sit atop the mountainous pile of cargo. Others are forced to hang from the sides as the truck bounces around the massive water filled potholes. The potholes are so bad that a truck can be completely ruined after one to two trips like this. The truck has too much weight attached and could easily flip due to how top heavy it is. To add to all of this, most of the world's poorest nations, which are based in Africa remain in a constant state of conflict and war so this makes for especially dangerous traveling conditions.

Throughout the world, whether it's in a high-income or low-income country, or somewhere in between there are several other factors to consider that present incredible dangers while traveling on roads. Most notably, drunk driving, which is one of the leading causes for traffic related fatalities worldwide. Let's pause on that for a moment... if you think about it, nearly all cultures are heavily influenced by the advertising industry - which is an extension of our trade based system.

Every social event, such as sporting events, concerts, parties, movies, etc, are all based off of the need to continually consume and alcohol is involved in most all of them. Therefore, it's really no surprise that alcohol is such a huge part of most cultures.

For example, the culture here in America is based heavily on alcohol consumption. Even the most mundane events, like having dinner is a reason to consume an alcoholic beverage. All holidays, special events, even a death in the family will be a reason to drink alcohol here. Basically, if you're sad, happy, or just bored, American culture says there is always a reason to drink alcohol. I'm sure this is similar in most all countries.

A SAD IRONY IS THAT BUSY ROADS AND HIGHWAYS ARE AN ALCOHOL MARKETING TEAM'S DREAM.

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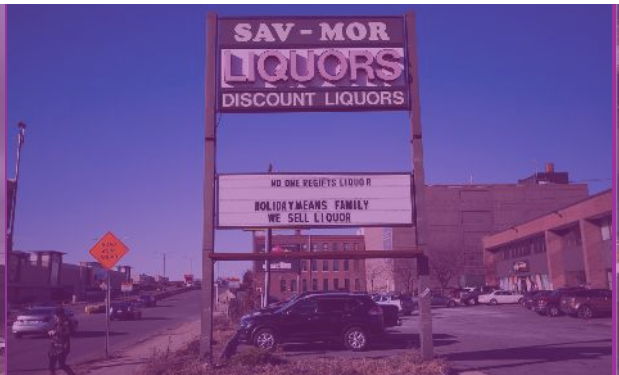
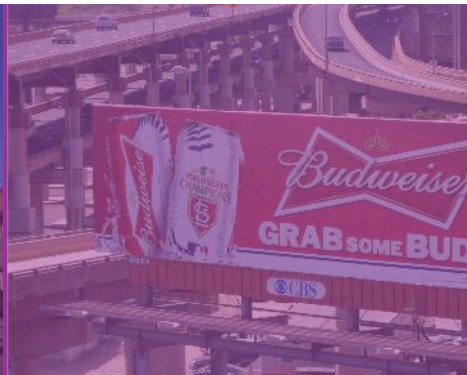





Beer & Bubbles
HALF OFF
HAPPY HOUR


QUALITY
#TASTEIS INTRODUCING A DEEPER SHADE OF AMBER
GLOBAL COOLING


SUPPORT
BUD LIGHT
Probably the green light you've been waiting for
martha's
furnishing fabrics
BUD LIGHT
ULTRA-FAST

CULTURAL INFLUENCES MAY BE THE REASON AMERICA IS 3RD FOR THE HIGHEST AMOUNT OF ALCOHOL RELATED VEHICULAR FATALITIES IN THE WORLD.

click images to enlarge

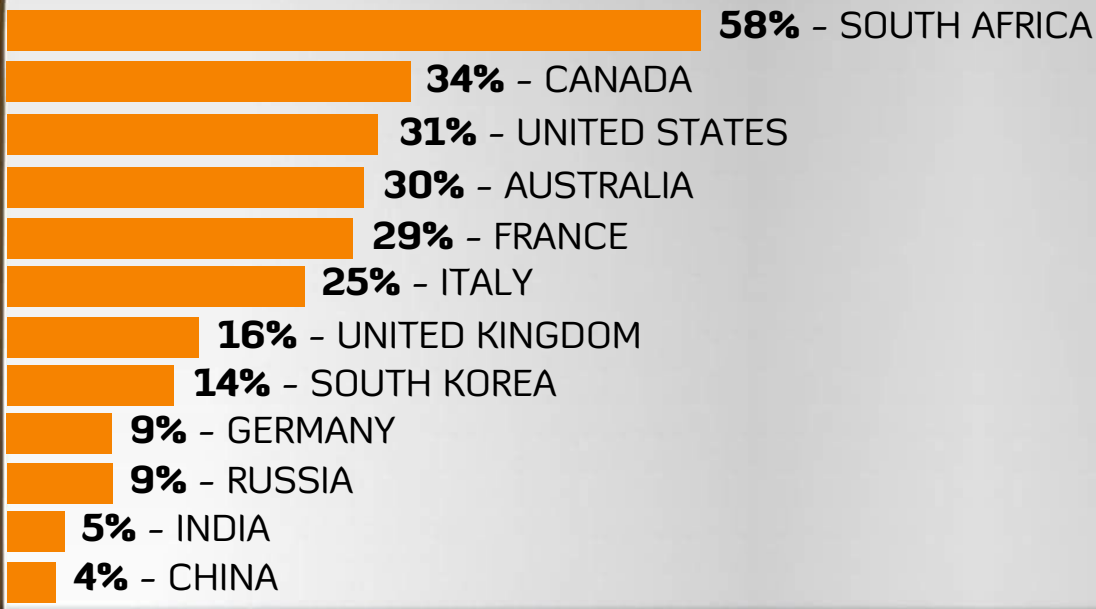
Despite maintaining strict laws and regulations against operating a vehicle under the influence, on average, **one person dies every 51 minutes due to drunk driving in the United States.**

If tested with a blood alcohol level of 0.08%, which is the legal limit here in the U.S., you may receive any or all of the following (depending on the state): serve jail time, pay thousands of dollars in fines, have your driver's license suspended or revoked, serve community service, have to answer to a probation officer, pay higher insurance premiums, and have interlock system installed in your vehicle (a device that measures your blood alcohol level every time you attempt to start your vehicle, if you BAC is 0.08% or above your car will not start).

Canada is second highest nation for alcohol related vehicular deaths in the world and South Africa is number one. Just like America, both Canada and South Africa have strong cultural ties (which, again, are just a reflection of the desires that are manufactured by the market system) to consuming alcohol for many different activities.

South African laws, much like the U.S. are some of the strictest against drunk driving in the world. Yet this does not stop people from driving under the influence of alcohol.

PERCENTAGE OF ROAD ACCIDENTS INVOLVING ALCOHOL IN 2015:

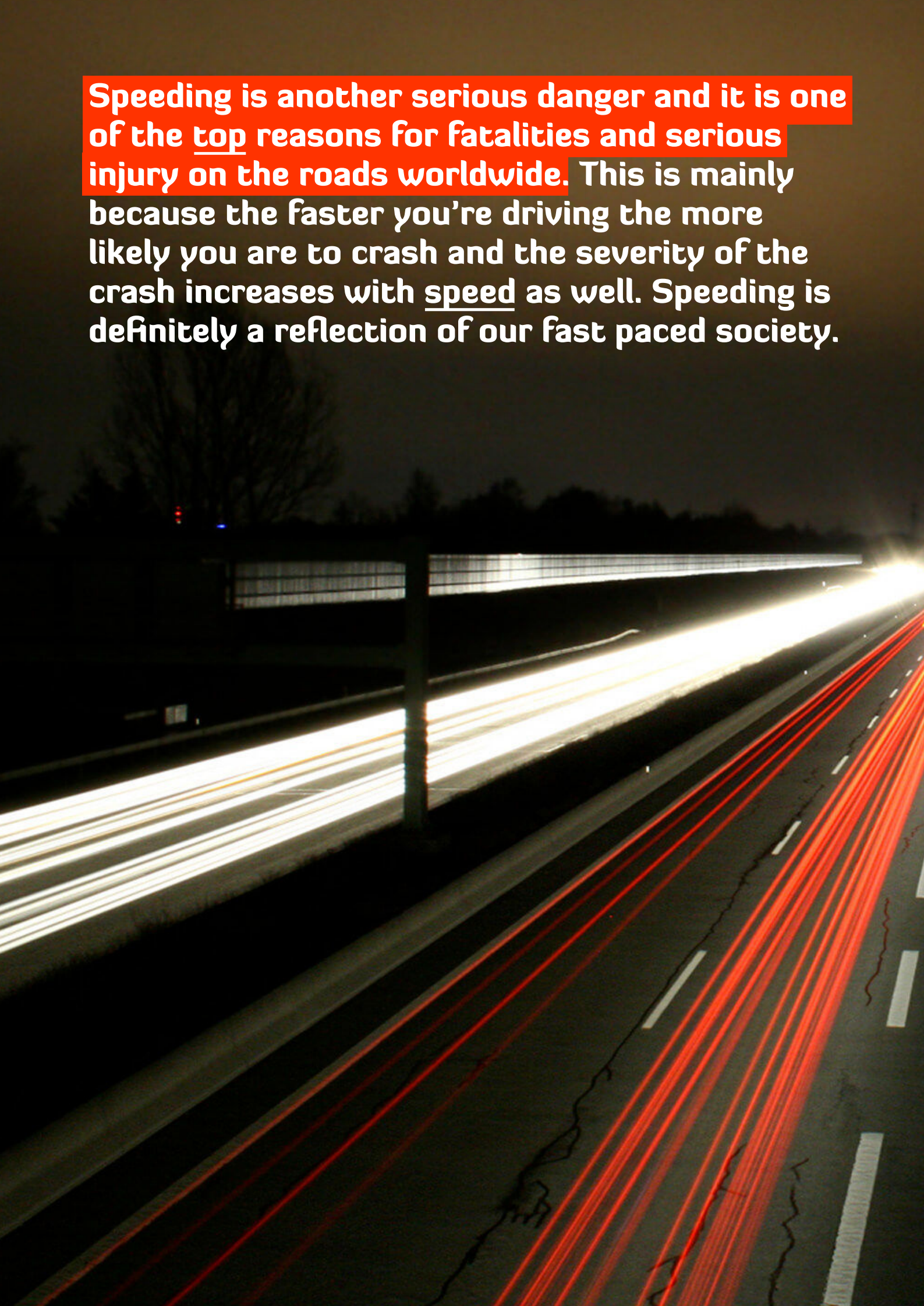


Another danger while driving is the distraction of gadgets, especially with the rise of the smartphones in the last 10 years or so and other electronics in vehicles, such as mini flat screens and car audio systems.

Just a quick side note: companies like facebook, instagram, twitter, snapchat, etc make major profits off your distractions. These billion dollar corporations design their apps to give you the same addictive sensations as gambling so that you stay on their sites longer. The more time you spend on these sites, the more profits they make. Most people know this already, yet cannot help but continue to 'play the slot machines' since they are so easily accessible on our cell phones and also, because we are being trained to do so. This TEDx talk by an ex google employee goes into more detail about this subject. Distractions can lead to slower reaction time, failure to stay in the correct lane, and shorter following distances.

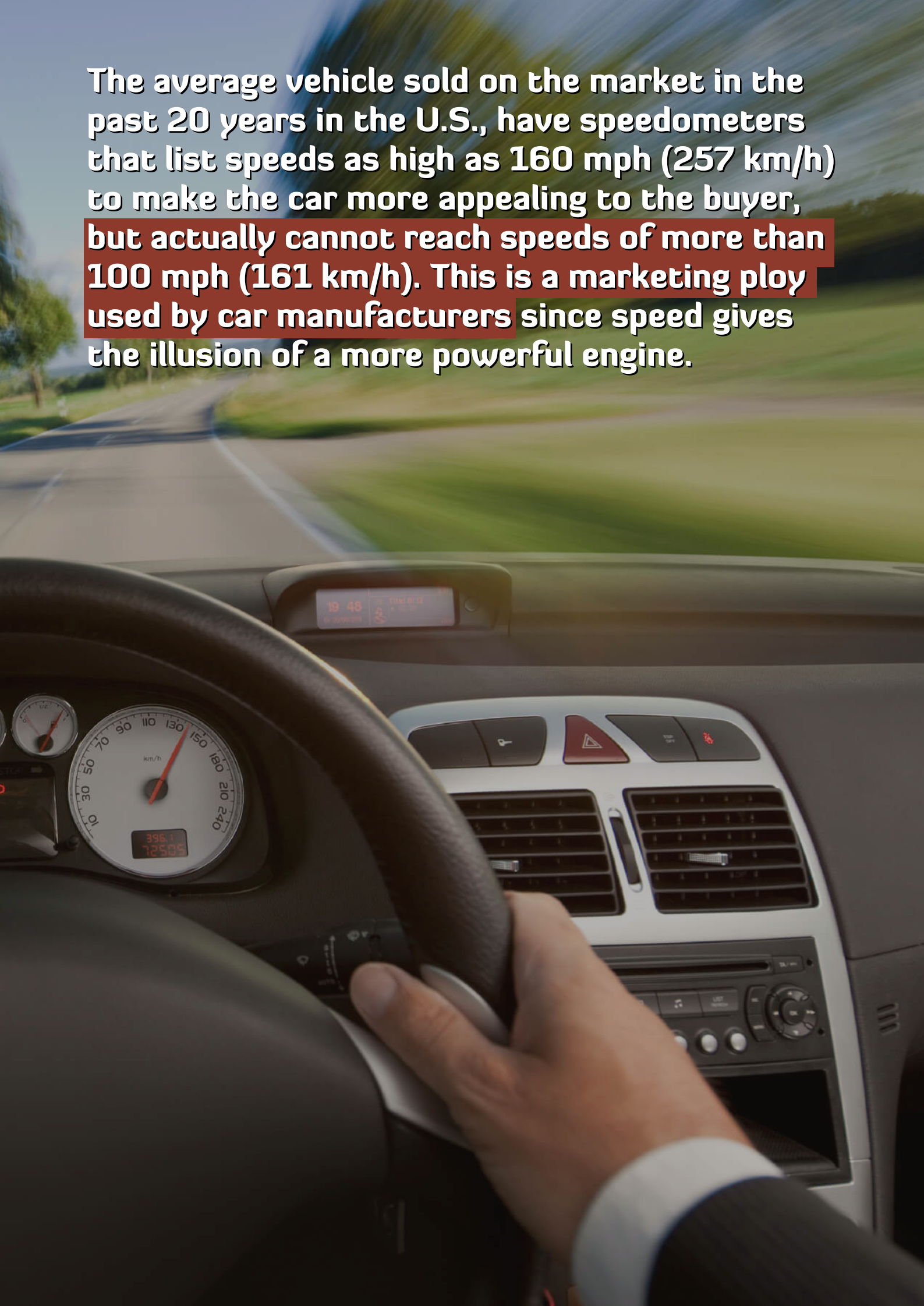
According to the WHO: "...due perhaps to difficulties enforcing this legislation, there remains little evidence of the effectiveness of such measures: in the Netherlands, mobile phone use has been banned since 2002 but there is mixed evidence about the impact of this measure."(source) Once again, there is little evidence to support tough laws having an impact on driving behaviour.

Speeding is another serious danger and it is one of the top reasons for fatalities and serious injury on the roads worldwide. This is mainly because the faster you're driving the more likely you are to crash and the severity of the crash increases with speed as well. Speeding is definitely a reflection of our fast paced society.



According to a (U.S.) survey, 60% of drivers say they speed because they are impatient with slower drivers even though 47% admit that they worry about getting into a crash. 27% enjoy speeding (which our current culture continually promotes through popular movies, television shows and sports like NASCAR or F1 racing) and another 27% are in a hurry to reach their destination. Since culture influences our thoughts and perceptions it is very easy to use cultural influences for marketing cars as well.


Tr/min x 100



The average vehicle sold on the market in the past 20 years in the U.S., have speedometers that list speeds as high as 160 mph (257 km/h) to make the car more appealing to the buyer, but actually cannot reach speeds of more than 100 mph (161 km/h). This is a marketing ploy used by car manufacturers since speed gives the illusion of a more powerful engine.

Also, we must account for the population of the world that uses personal transportation as a way to earn income. For instance, motorist in China who work in the food delivery service. These people put themselves and others at risk by speeding because they are under so much pressure to make deliveries on time. In fact, if they do not deliver the food within a certain time frame, they are fined by the company who employs them and they may also face a lot of negative backlash from customers who will give them bad reviews, thus hurting their potential to earn an income.

This has led to an overwhelming amount of traffic accidents involving employees from these food delivery services. Throughout the world there are many strict laws that try to discourage drivers from speeding however, this does not physically stop people from doing so because the conditions that cause speeding do not change.

You may also consider weather such as snow, rain, ice, wind, fog, and sun glares to be dangers when behind the wheel. In addition to sleepiness, and human fallibility. I'm not sure how laws will help with this. Sun glares are really dangerous here in Los Angeles (where I currently live) during rush hour traffic.

When the roads are packed with cars headed to work between the hours of 7am-9am and again in the evening around 4pm-7pm the sun glares are the worst. If you're headed east in the morning and west in the evening, between those hours, it is impossible to see. Everyday at this time I am worried I may strike a pedestrian or another vehicle due to lack of visibility. Not only would I feel incredible guilt, I would also be found at fault, be charged with a serious crime and labeled as a murderer and given jail time. This type of situation is horrible for everyone involved.

This leads us to the stress of private ownership of vehicles. Having to maintain your vehicle is very costly and time consuming. Gas, oil changes, tires and rotation, car battery, windshield wipers, coolant fluids, car wash, shocks, sparks, repairs, faulty parts, the list goes on and on.

On average I spend $20 USD in gas a week - that's $960 USD a year. Also, an oil change for my car costs $70 USD every 3 months, which is $280 USD yearly. In addition, my car is due for a new battery. Since I drive a hybrid, this battery will cost me roughly between $2000 - $4000. The car itself is only worth $5000 and that's being generous. This makes me want to pull my hair out.

Paying for parking is a huge issue here in Los Angeles. Since the need to keep up with the consumer car demands is brought on by the need to get back and forth for work and around town in a major metropolitan area that lacks decent public transportation, free/inexpensive parking is scarce. Therefore it can be made into major profits for both the city and private companies. On average, one might spend another $20-$75 a week here to park your vehicle either on the street at a meter, in a parking lot or in a parking structure. In other major cities where parking lots/structures are overly abundant, yet free parking is scarce you will spend incredible amounts of money.

Take for instance, downtown Washington, D.C., on average parking costs $9-$10 per hour, $35 for a 24hr period, and around $250 per month. This is like having a second car payment.

Whats even more insane is how car manufacturers create demand to keep the cycle of consumption going. This endless cycle creates the need to store all of these vehicles while the people who own those cars go to work, shopping, out to dinner, movies and other various activities based around consumerism. Usually the state will have to step in and build parking structures to house these unused cars and they do so using tax dollars. Then they also charge a fee for parking these cars in the structures or lots, which generates billions of dollars for both state and private enterprise (sort of the same way toll roads do).

The really crazy part of it all is that those parking structures remain empty once people leave work or the malls/shopping centers, movie theaters, restaurants, etc. are all closed. It really is such a waste of space and resources.

Also, there is the major stress of parking/traffic tickets.

The city of Los Angeles has a separate division of law enforcement for parking. If you park on the street, there are so many confusing street signs that post regulations it is impossible to keep up making drivers highly susceptible to getting parking tickets.

Fun fact: in 2016 the city of Los Angeles generated nearly $148 million from parking tickets and heavily relies on this money to cover budget deficiencies such as city salaries and administrative costs.

Therefore, the city must give out these tickets in order to keep operating. (source)

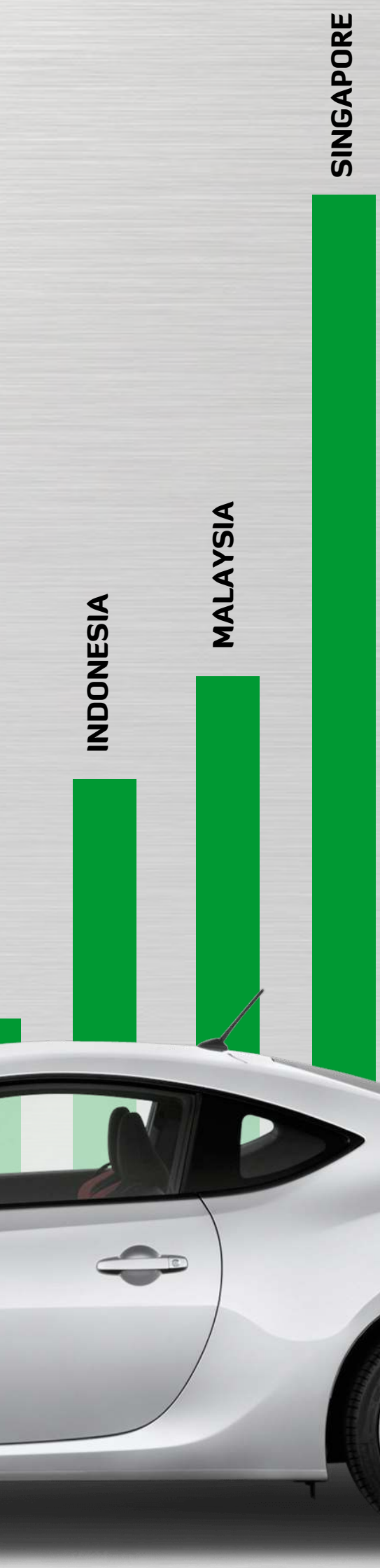
Other financial stressors are registration for license plates, tags, and drivers license. I thought CA was bad until I found out certain cities in China make you enter a lottery to register your vehicle. In Beijing officials are limiting vehicle registration in order to cut back on road capacity and pollution.

Most people wait years and still get denied, but end up risking it and drive anyway because they need to get to their jobs. Of course this gives reason for more traffic tickets.

Another heavy cost is the monthly car payments.

Mine is $300 USD. As I mentioned before, the current value of my car is listed at $5000. However, once you add in the interest, warranty, tax, etc. I still owe $13,000!!! I've been paying on this car for nearly 2 years. So, far I've paid $7200. I was actually forced to buy this car because of my car accident. The other car I had was completely demolished. So, since I still owed on that vehicle and the other driver's insurance only covered the "value" of the car, it left me with a $2000 balance, which was rolled over onto this loan. So, in total I am being charged around $17,000 for a car that it is only "valued" at $5000. If I decide today that I no longer want this car and try to sell it, in theory I will still owe around $8000!!! If I keep the car and pay for the entire term of the loan, which is 6 years (I have 4 years left) I will have paid nearly $21,000 for this stupid car.

However, looking at other parts of the world, it seems that other countries will pay 5x more than Americans for personal ownership of a vehicle. Countries like Indonesia will pay $59,666 USD, Malaysia $73,529 USD, and in Singapore $135,421 USD for a Scion FR-S, while in the United States it is listed as $25,000 USD.



Car insurance is another major scheme in the personal ownership of vehicles. It is required by law to carry car insurance and the monthly payments range from $100-$300 usd depending on what type of vehicle you drive. The payments may vary depending on what country you reside in as well. In America, you will also have to pay a deductible ranging from $500-$1500, meaning you must pay this amount before the insurance company will pay for car repairs, injuries, etc.

Again, this will vary depending on what country you live in. If you are involved in a car accident, regardless of the severity of your injuries, you will have to jump through hoops to use your insurance during an emergency; even though this is what insurance is intended for. Most insurance companies do what is best for their bottom line.

In my particular situation, after weeks of going back and forth, I was sent a 'bait check' from the other insurance company; mine was of no assistance because I could not afford to pay the deductible.

Basically if I were to cash this 'bait check', then I could not come back and file a claim for bodily injury or property damage with the insurance company. These companies are filled with lawyers and underwriters who know every loophole in the book. Often times, people who are involved in car accidents go weeks without realizing they are injured or may be like me, lacking medical insurance and do not know exactly what is wrong with them. If the insurance company manages to get you to cash the check before you know that you have an injury, then they are completely off the hook from helping you with medical expenses or repairs for your car. This seems super shady considering that it is mandatory to carry car insurance in many countries throughout the world and one would think that your monthly payments added up over time would be more than enough to cover you or anyone else in case of an accident.

To sum this up, if you calculate how much i've paid in car insurance since I started driving 20 years ago, it would basically amount to $48,000! Yet, I've only had to use it on two to three occasions for very minor things. There would be no profits for the insurance company if they didn't operate on probability. Through the use of algorithms an insurance company can figure out exactly how much to charge each individual to create massive profits. I ended up hiring a lawyer because I caught onto the fact that it was going to be impossible to get medical attention without one. I could tell that something was wrong and that I needed to go to a doctor asap. Personal injury lawyers are even worse than the insurance companies. In fact, the two work hand in hand and make you feel like an outsider as they communicate amongst themselves, leaving you in the dark. They basically know from the start how much your injury is "worth" and will use this to decide which cases are priority. Others get tossed to the side since it's just easy money to them.

This is an extremely exploitative business that profits off of other people's injuries and sometimes even their death. These lawyers are basically loan sharks that front people money to go to the doctor until they get a settlement (payout) from the insurance company. If you do not have medical insurance you will only be able to use the doctors that they recommend. All of the doctors I was sent to did the bare minimum and charged me 2-3 times as much per visit. For example, the first doctor I went to tried to treat my cervical injury through chiropractic methods. On average, a chiropractic visit generally costs around $65 usd.(source) However, I was being charged $295 per visit. It is important to note that chiropractic treatment is a form of alternative medicine based off of pseudoscientific ideas with no evidence of curing injuries (source). This is another not so helpful service kept in place by the need to create jobs and profits.

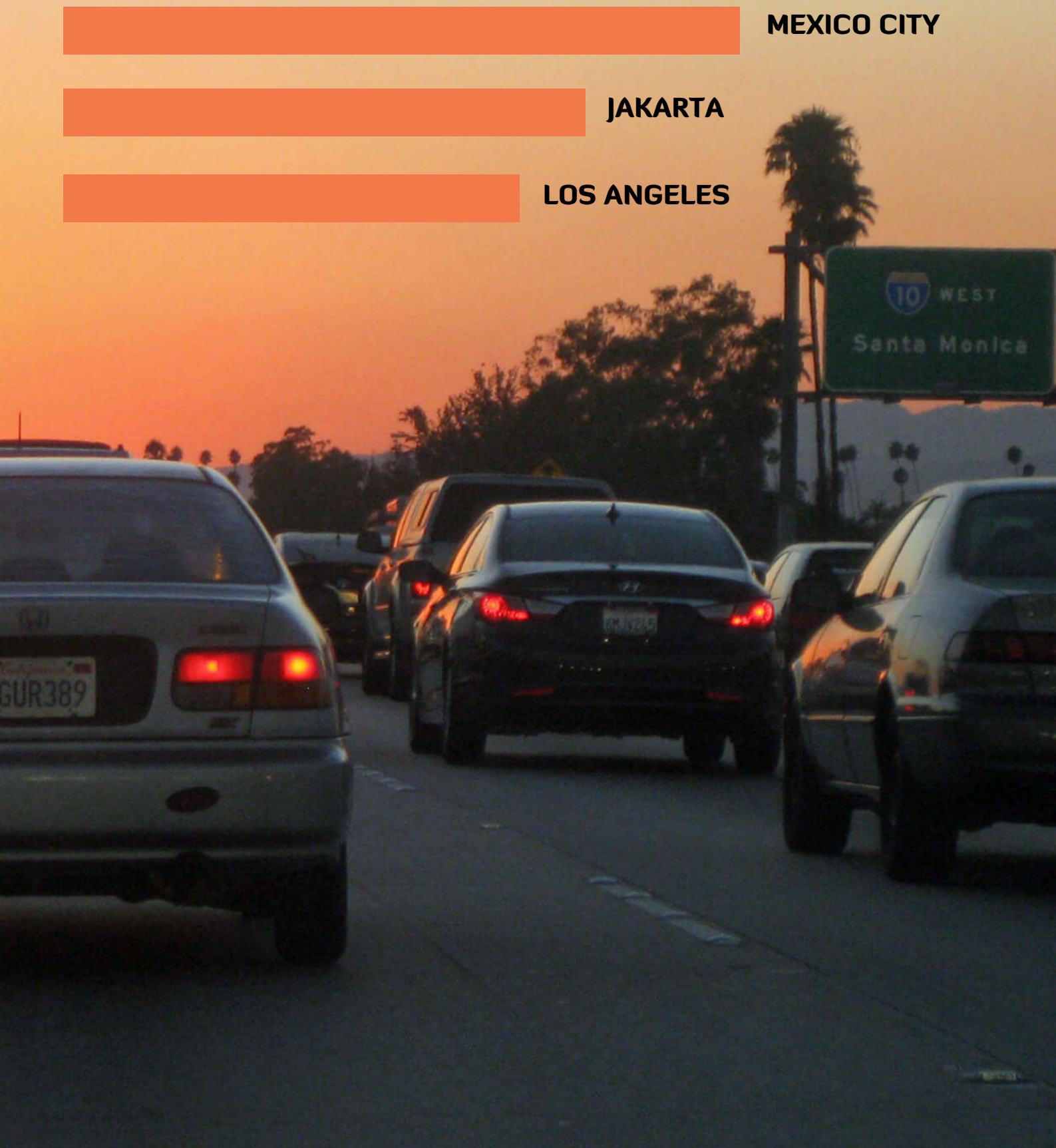
I basically had to beg my lawyers to send me to a physical therapist to treat and help me manage my injury. Since they bill you after everything is said and done, you have no idea how much debt you are racking up.

The whole process of dealing with insurance companies, lawyers, and doctors is like a whirlwind and most people are still in an irrational emotional state from the trauma of a car accident so they are easily manipulated.

I was told by the law clerk that a lot of their clients end up owing the lawyers and doctors because the settlement doesn't cover it all. This is so fucked up because these lawyers charge 35% and take that before paying off all the bills. Injuries from car accidents equal huge profits for the lawyers and doctors and if the insurance company can get off without paying on a claim they profit too.

Another enormously stressful, dangerous, and time consuming issue for drivers throughout the world is being stuck in traffic.

To put this into perspective, people in Mexico City spend an extra 227 hours per year sitting in traffic, compared to an extra 184 hours a year in Jakarta, and 170 hours per year in Los Angeles. This creates a lot of impatient drivers out on the roads and this leads to road rage.



Here in Los Angeles, going a few miles from your house for simple chores can take you hours and having to drive in hectic conditions can make anyone an anxious mess. Most drivers become impatient from long commutes due to dense traffic and congested intersections and they are willing to risk other's lives just to save a few minutes on their commute.

As you will see in this video, being in traffic in a large city where most of the roads are outdated and incapable of handling a large volume of vehicles is just insane. Crosswalks are far and few between and the bike lanes aren't protected. This causes pedestrians and cyclists to become inpatient and either walk or ride between cars in undesignated areas. This is incredibly dangerous because it is hard to see pedestrians, even in the daylight. I used to live near several busy roads, one being Venice Blvd.

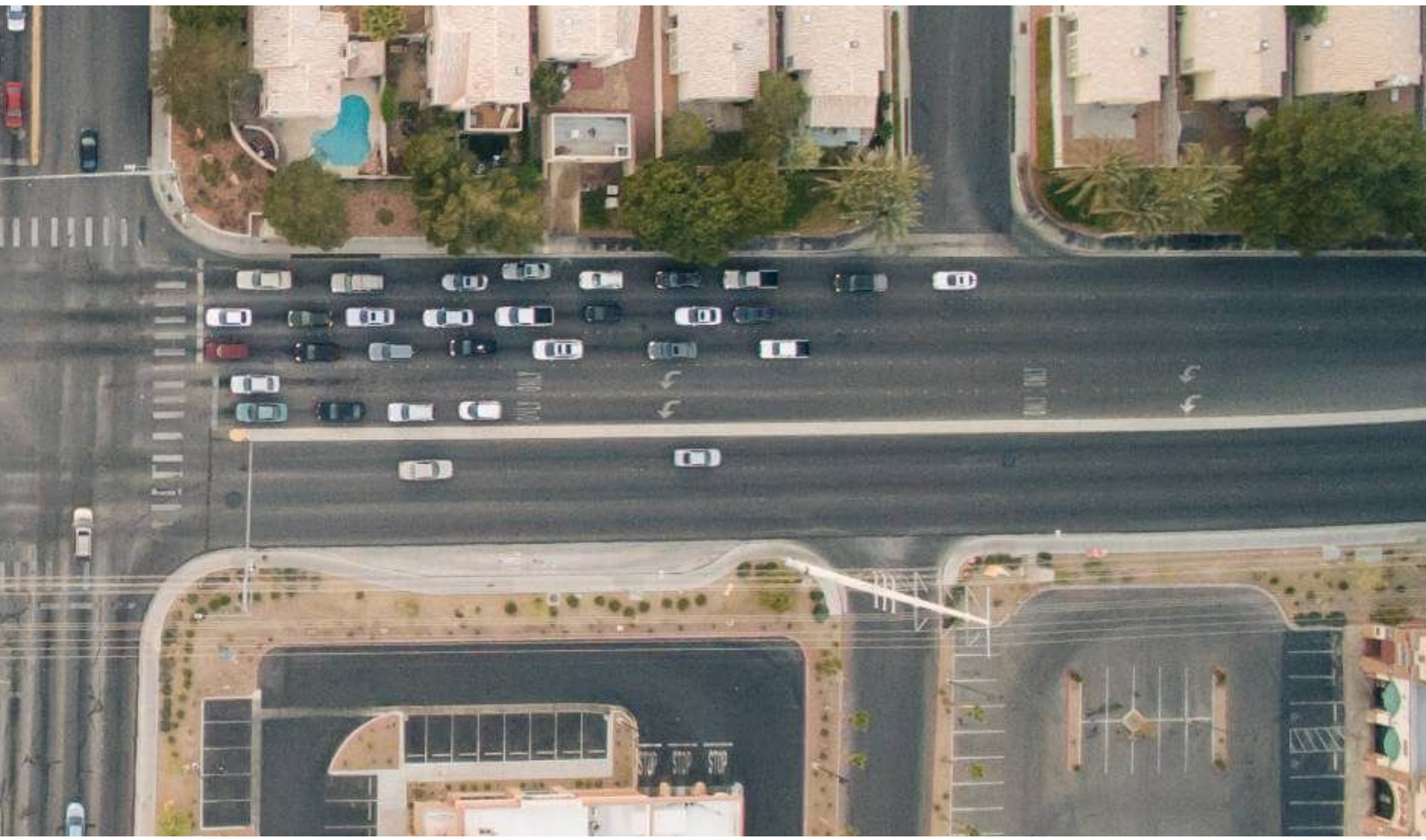
This street is nearly 10 lanes wide if you include the left turn lane and the parking lane. The crosswalks are at every intersection where there is a traffic light. These are very big blocks so, a pedestrian may have to walk more than ½ a mile (0.8 km) to get to the next crosswalk. This causes a lot of people to risk it and cross where there isn't a designated lane. This is a very busy street and the average vehicle travels between 45-60 mph (72-96 km/h).

This street is even dangerous for those that do use the crosswalks and adhere to the traffic signals (walk light) because the vehicles that are either making a left turn or right turn intersect with the pedestrian crosswalks. We have a lot of homeless who are often under the influence of drugs/alcohol and suffer from behavioral disorders that walk out without thinking about it.

In addition, there is a large bar district a block up and many people who live in the neighborhood walk to that area, then walk home after a night of consuming alcohol. Again, this makes for poor judgement. I've also encountered many elderly and physically handicapped people, mostly in non-motorized wheelchairs who cannot make it across the street in the short amount of time allotted by the walk signal, nor do they always cross in designated areas. Also the visually and hearing impaired people are at a huge disadvantage as pedestrians on these chaotic streets.

If someone were to walk out in front of my car on this particular street, I would either hit them or another car trying to avoid them. Here's another video that gives an example of a busy intersection where it is completely up to the drivers judgement to decide when to go. I apologize for the narration on these videos. While there is an abundance of videos with "bad/crazy" drivers, it is difficult to find any without people narrating. As you can see, it's a complete clusterfuck. This is a typical intersection here in Los Angeles. You can search the web and find thousands of these videos full of road rage and insane accidents.

So, it is not limited to this part of the world. I am using this as an example because this is what I am familiar with. In any major city like this, you will have many different driving styles. People from all over the world, who have experience driving in places with different rules and infrastructure meshing in high speed areas creates a lot of chaos. I have lived in several different regions of the U.S. and I can tell you that all states, cities, and counties have different rules and styles of driving and this is all within the same country.



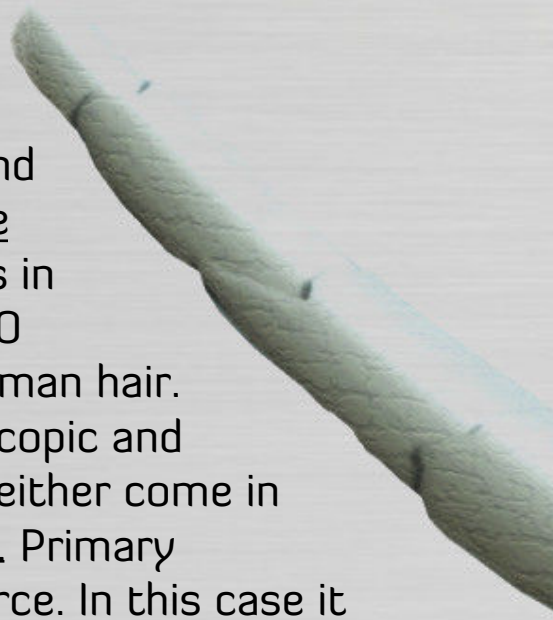
You may even have different rules within the same city. Using L.A. as an example, if I am driving in Burbank, all vehicles must yield to pedestrians no matter what. However, in Culver City, where I was living, drivers only have to yield when pedestrians have a walk light. So, this causes a lot of confusion for both drivers and pedestrians - it's dangerous and it makes no sense. Also, there are elderly people that lack physical strength with poor vision and slow reaction time; as well as new drivers who have little to no experience on the roads. Combine all of this and it is a recipe for disaster.

Our current transportation system is a huge environmental issue as well. 92% of the world's population currently lives in an area where the World Health Organization's air quality guidelines levels are not met and "transport is responsible for around 25 to 70% of urban outdoor air pollution, depending on the city."

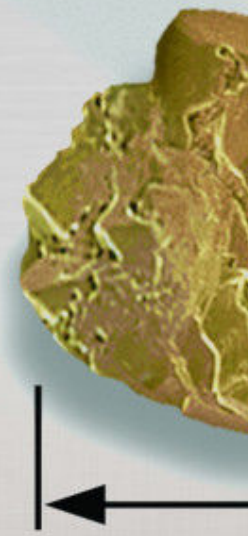

三环路
3rd Ring Rd
(国贸桥)
1.5km
二环路
2nd Ring Rd
(建国门桥)
3.5km

One of the most dangerous forms of air pollution is particulate matter (PM) since it affects more people than any other pollutant.

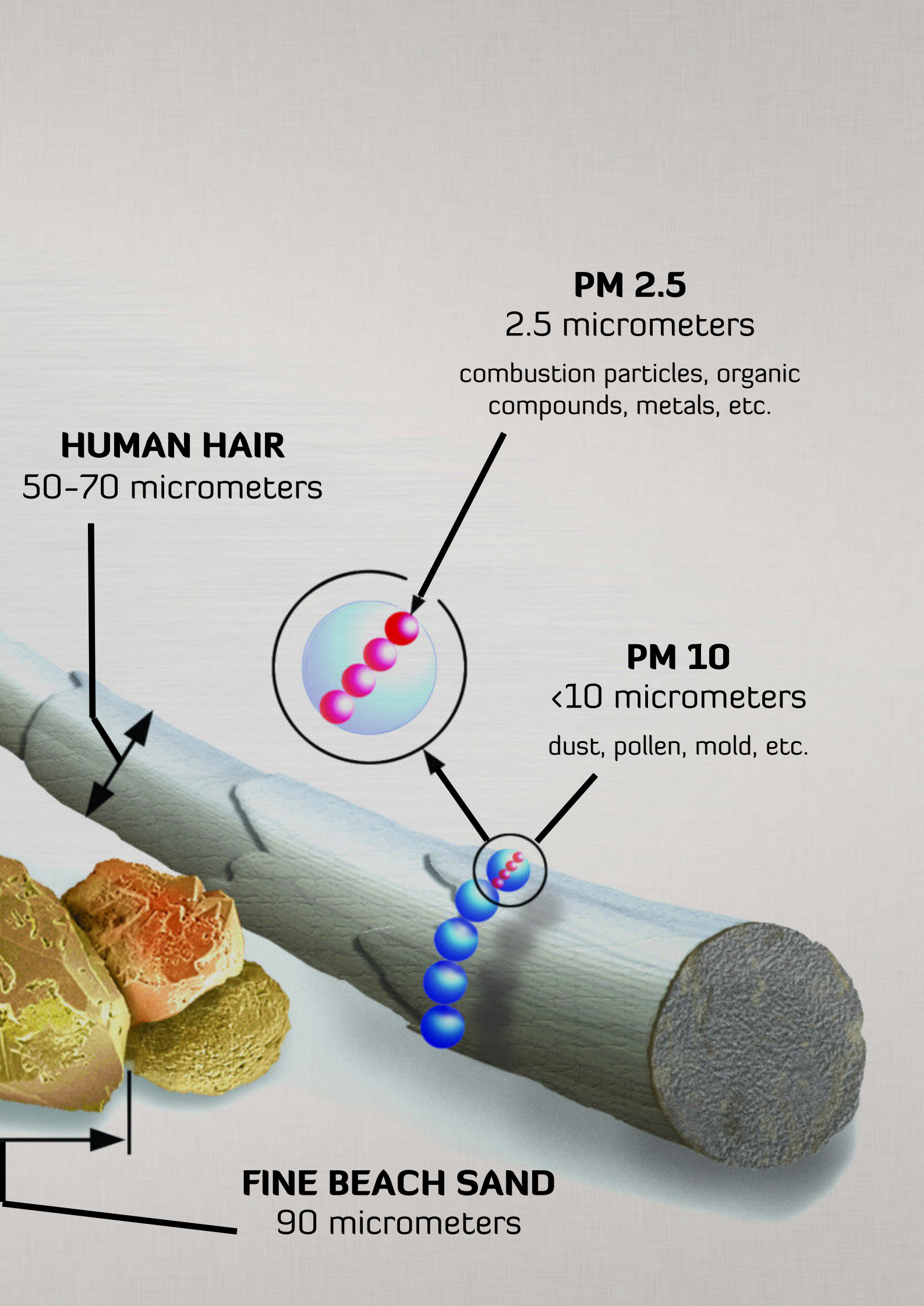
PM is a mixture of solids and liquid droplets floating in the air that range in size, shape, and origin. Coarse particles are harmful and can cause eye, nose and throat irritation. However, fine particles are much more dangerous because this type of particulate matter can get deep in your lungs and may enter into your bloodstream.



In addition, the smaller the particle the longer it will remain suspended in the air and the further it can travel in distance. Coarse particles (PM 10) are 2.5 - 10 micrometres in diameter. To give you an idea of the size, 10 micrometres is less than the width of a human hair. Fine/ultrafine particles (PM 2.5) are microscopic and cannot be seen by the naked eye. PM can either come in the form of primary or secondary particles. Primary particles come directly from a specific source. In this case it comes straight out of the tail pipe of a vehicle as a result of incomplete combustion of fossil fuels, biofuels or biomass or as dust stirred up by vehicles on the road.

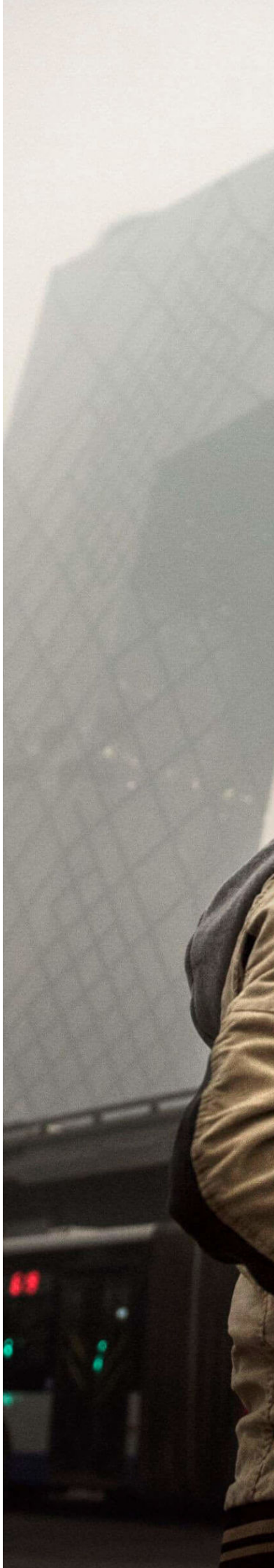


Secondary particles are the result of complex chemical reactions in the atmosphere when primary particles in the form of aerosols (PM 2.5 or below) react with sunlight. When this happens, the coating on the particle "acts like a lens and focuses the light into the center of the particle, enhancing warming", which contributes to climate change.


PM 2.5
2.5 micrometers
combustion particles, organic compounds, metals, etc.
HUMAN HAIR
50-70 micrometers
PM 10
<10 micrometers
dust, pollen, mold, etc.
FINE BEACH SAND
90 micrometers

In addition to PM, vehicles that combust fuel emit other smog forming emissions. Smog is usually a visible pollutant that leaves a haze throughout the sky and gets worse in high temperatures. Smog can be quite harmful for those that are sensitive to it. This includes people with heart or lung disease, older adults, and children, making it difficult to breathe triggering lung diseases such as asthma, emphysema, and chronic bronchitis and in some cases death.

People who live in large metropolis areas with lots of traffic congestion are vulnerable to high levels of smog exposure and this can have a major effect on one's health.



Greenhouse Gas emissions (GHGs) are another type of air pollution that is emitted from vehicle tailpipes that combust fuel. This form of pollution affects the atmosphere as well as those that are exposed to it. GHGs can remain in the atmosphere for 100 years or more and act as a blanket around the earth, trapping in energy. This then causes temperatures to rise, changing the earth's climate, raising sea levels, causing dangerous effects on human health and welfare, and damages the ecosystem.

Man-made pollutants are irrespective of man made borders. Air pollution produced in the continent of Asia can travel over the pacific ocean and affect the air quality in the United States. Therefore, it is silly for human beings on a singular planet to try to tackle these types of issues by representation of their favored tribe.

Rather, we should work together to eliminate the source in order to truly improve the quality of life for all that inhabit our planet.

A few cities around the world such as Beijing, Delhi and Paris have all done an "odd-even" license plate scheme where on certain days plates ending in odd numbers are restricted from driving and then the next day it rotates to plates ending in even numbers in order to curb air pollution, but it did little to no good. It is also highly important to note that laws do not stop automobile manufacturers, such as Mercedes-Benz, Honda, Mazda and Mitsubishi and most notably Volkswagen (VW), just to name a few, from cheating on emissions tests. "The US Environmental Protection Agency discovered that 482,000 VW diesel cars on American roads were emitting up to 40 times more toxic fumes than permitted - and VW has since admitted the cheat affects 11m cars worldwide."

Noise pollution from traffic is widely overlooked.

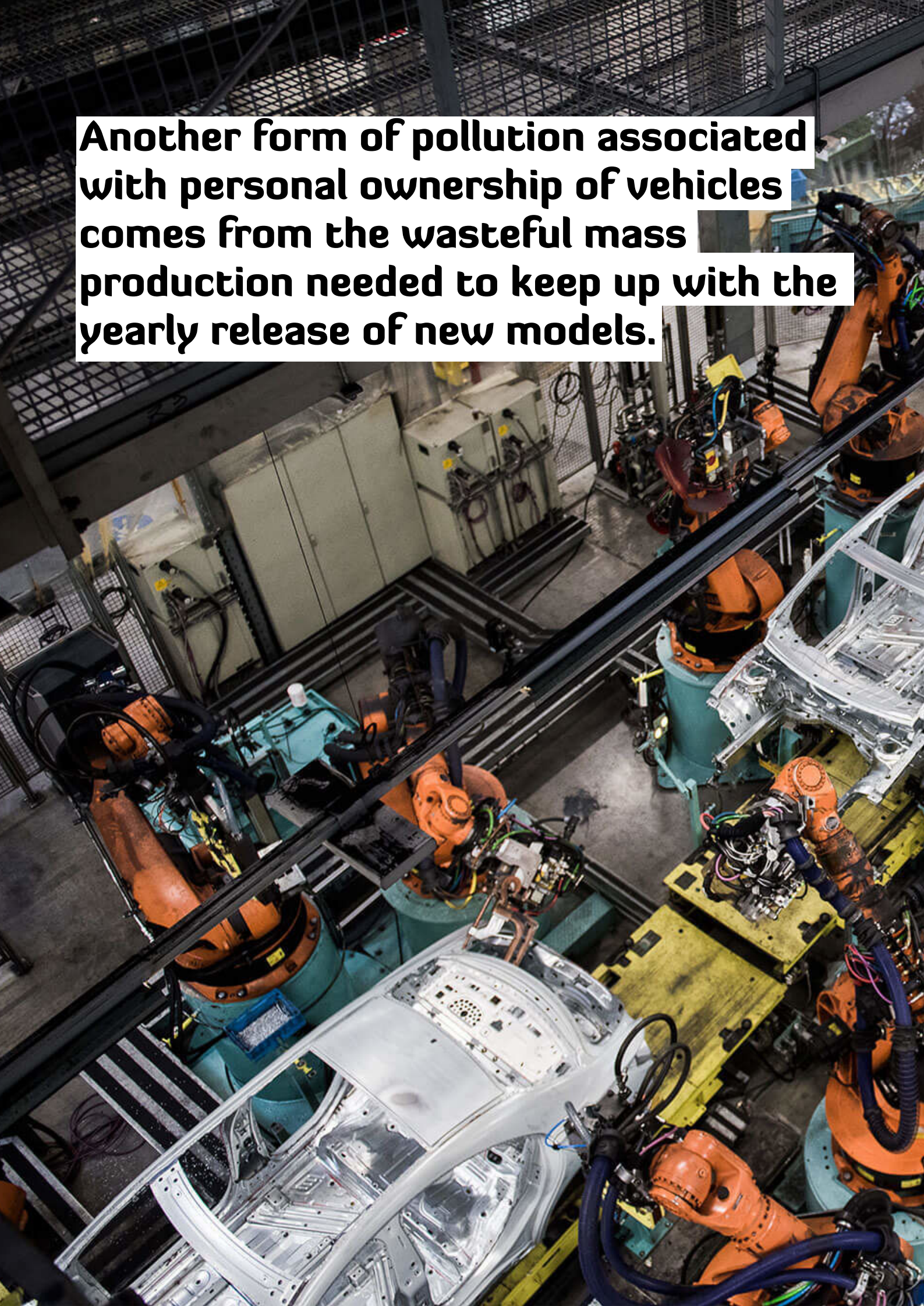
One study, which was the world's largest, involving 41,000 people in over 5 countries for 5-9 years, measured the effects of air and noise pollution on one's blood pressure. This study shows that those exposed to air and noise pollution simultaneously have increased chances of developing high blood pressure (hypertension) similar to the risks of being overweight. This study was also able to measure the effects of noise and air pollution separately and the results showed that those living near busy streets with heavier amounts of noise pollution (50 decibels) had a 6% increase of developing hypertension.

Furthermore, road ecology studies show that noise pollution from roads has a negative effect on wildlife, particularly songbirds by interrupting their calls used for communication, migration and other purposes. In addition, species abundance declined near major roads. Most neighborhoods that are located near busy highways are surrounded by noise barriers to block out loud sounds from vehicles, however these contribute to the destruction of wildlife habitat and in most cases are unsightly because they block out scenery and look somewhat like prison cell walls.

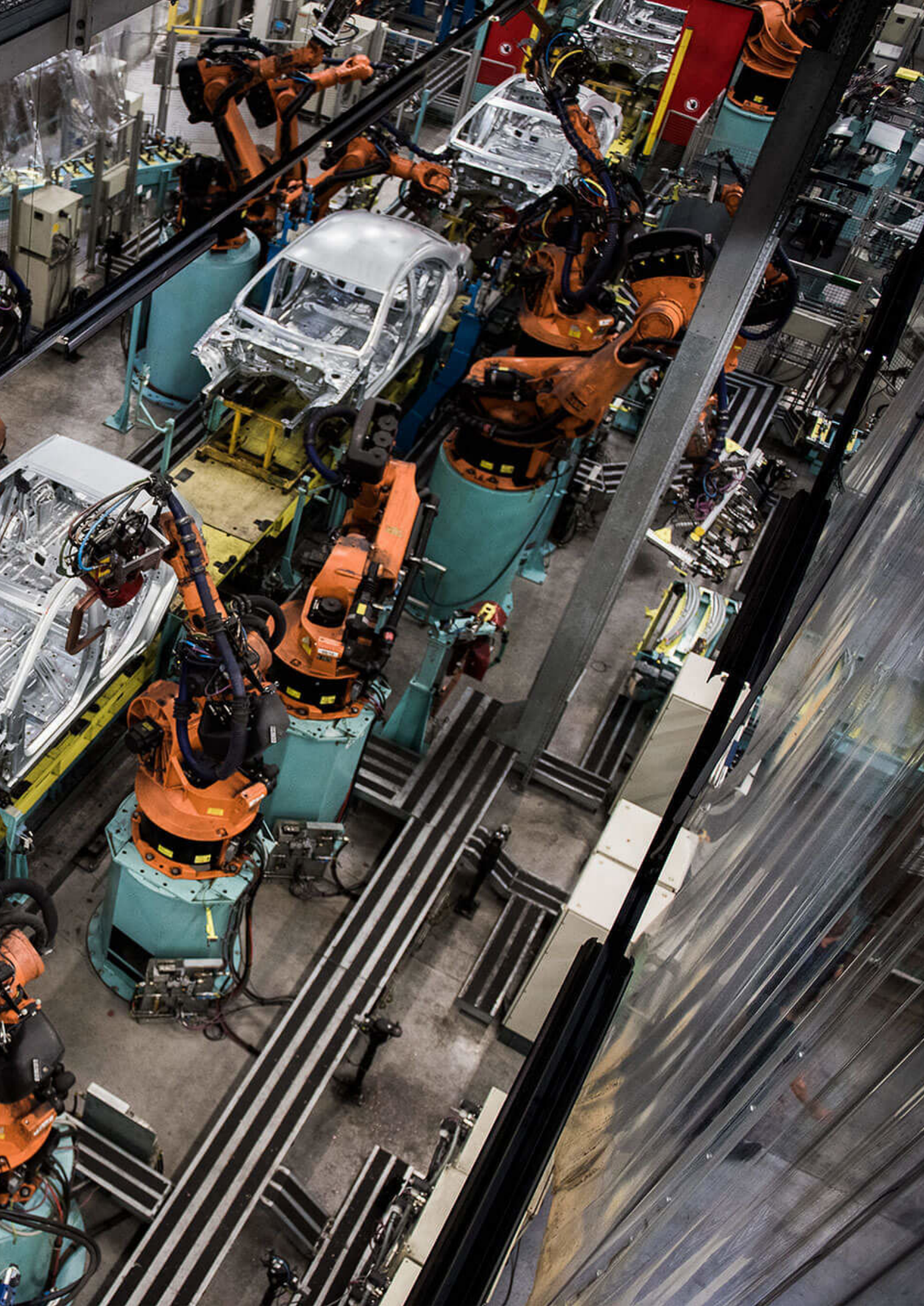
In fact, roads in general contribute to large portion of habitat destruction and deforestation.

Open spaces created by paved roads leaves certain wildlife vulnerable to prey and those that do choose to cross the road may not be so lucky. On unpaved roads plant growth is prevented due to compact soil from vehicle tires and foot traffic. This creates ecosystem damage since trees absorb gasses like carbon dioxide, carbon monoxide, and sulfur dioxide and produce oxygen. In addition, trees house and feed many animals.

Also, runoff from roads produced by rainwater or melted snow mixed with gasoline, motor oil, heavy metals like copper, zinc, lead, and nickel, deicing chemicals, trash and other pollutants can contaminate water.



Another form of pollution associated with personal ownership of vehicles comes from the wasteful mass production needed to keep up with the yearly release of new models.



The TROM ebook "The 'Property' of Waste" presents the problems and solutions aligned with this subject. We will also discuss this subject a bit more in this article. It is estimated that by 2035 we will hit a whopping 2.5 billion vehicles worldwide.

That amounts to 1 car for every 3 people on earth, including those who are incapable of driving and those who chose not to own a vehicle.

So many resources are poured into the production of these vehicles. Currently, we rely heavily on human labor to mass produce our vehicles which employs approximately 9 million people worldwide. This wastes so many human lives plus it's extremely inefficient with our current technological capabilities. Since the automotive market is built solely around consumerism rather than actual need, vehicle manufacturers must continually create new models that appeal to one's materialistic desires.

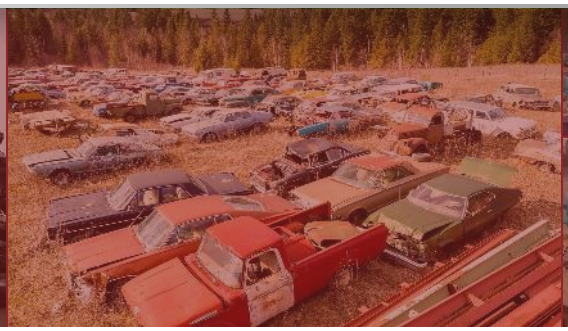
It is highly impractical to produce new models every year simply based off of the appearance rather than performance of a vehicle.

One major reason is that the mass production of vehicles creates a lot of unnecessary waste. Resources, such as copper, lead, steel and other various materials are repeatedly capitalized on to generate more and more profits.

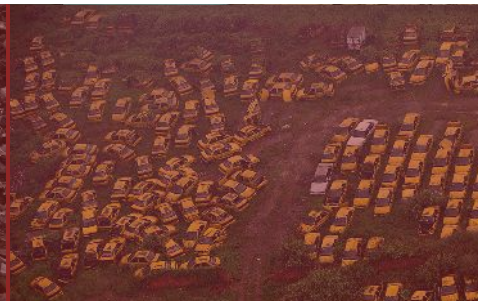
In recent years, manufacturers are opting for light weight and more fuel efficient materials. Plastic is one example and the use of it in the production of cars has risen dramatically . Plastic, however is a non-biodegradable material and if it isn't being reused or recycled this will have a long lasting effect on the environment. The majority of car parts can either be recycled or reused. As of 2017 there are few formal regulations regarding recyclability and disposal of vehicles worldwide.

The EU, the US, and several countries in Asia have taken the initiative to encourage manufactures to produce vehicles without toxic or hazardous materials; give monetary incentive to persuade consumers to recycle vehicles or in some cases there are laws that require the vehicle be properly recycled at the end of use.(source) However, the EU is experiencing difficulties implementing these laws and has had very little success with consumers participating in the recycling programs. (source)

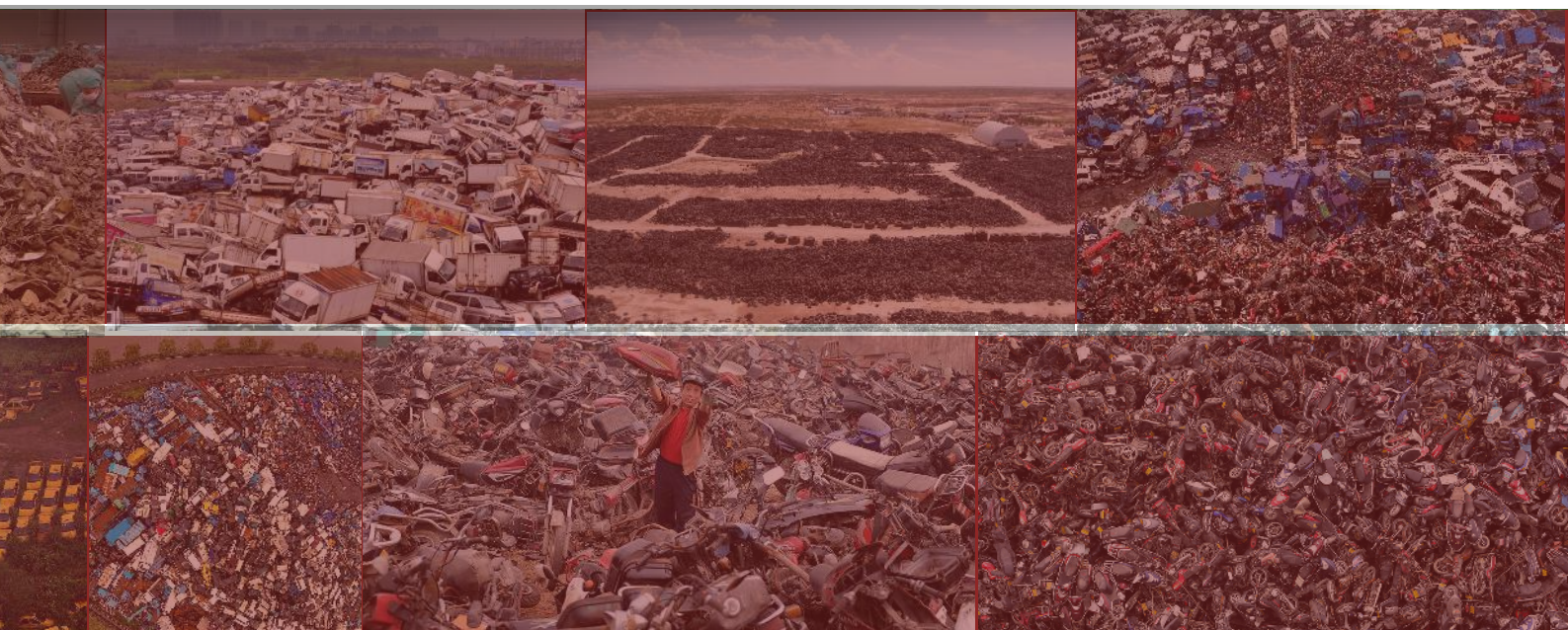
click images to enlarge





WITH PROPER MANAGEMENT OF VEHICLE WASTE, IT'S ESTIMATED THAT ALMOST 2 MILLION TONS (~1.8 MILLION TONNES) OF MATERIALS CAN BE RECOVERED BY THE YEAR 2020.



BASICALLY, OUR CURRENT POTENTIAL FOR RECYCLING VEHICLES IS SO HIGH THAT IF WE EFFICIENTLY PUT THIS INTO USE WITHIN THE NEXT 2-3 YEARS, WE COULD EASILY RECOVER AS MANY RESOURCES AS THERE ARE COMMERCIAL AIRPLANES IN EXISTENCE. THIS IS REMARKABLE!

Just think of what we could do with all of that. This means we could literally rebuild the entire fleet of commercial airplanes from 2017 (source 1, 2). Especially since cars and airplanes are made from the same kinds materials.

Plastic can be melted, grinded or molded into new forms – cutting back on petrochemical sources and carbon dioxide. Metal can be scrapped and recycled. Parts that are still in good condition such as the engine, catalytic converter or even a door frame can be reused. Glass can be reused or recycled and used as a raw material. Even items like tires that generally sit in landfills and turn into hazardous waste can be recycled and reused, saving natural resources from continually being exploited.

This is highly achievable with the current technological capabilities in existence today (source) and if we were to move into a society that maximizes efficiency to the best of our ability for that time frame, these statistics would become even better with the potential of zero waste. However, since our current system is based off of never ending profit margins the cycle of waste will continue because when items such as cars become highly efficient there is no money to be made.

VISION ZERO

Vision Zero is an interesting way to address global safety and environmental issues that arise from traffic in our current society since it is more technical and takes on a scientific approach rather than being purely ethical. The VZ approach accounts for human fallibility and places the blame on the overall system design including infrastructure and vehicle technology.(source)

Rather than reacting to auto fatalities and serious injury like the current law system does by simply blaming "bad" driving on the citizens, VZ works to prevent all auto accidents from ever happening. Hence the name Vision Zero. The VZ program has had really great results where it originated in Sweden - reducing pedestrian deaths by nearly 50%. (source) This technical and scientific approach of resolving traffic related problems has quickly spread to cities all around the world, inspiring many different versions of VZ.

Some examples include:

San Francisco plans to add protected bikeways, safety zones, corner bulb-outs, and transit boarding islands throughout the city and encourages other cities to use their work as a guideline. (source)

BUS ONLY
TAXI

In Santiago Chile a group of collective activists took it upon themselves to temporarily transform six of Santiago's busiest streets into a "calming zones" using simple forms of Tactical Urbanism. Tactical Urbanism is a grassroots movement involving participatory short-term efforts to inspire change, and propose solutions to traffic challenges with realistic expectations involving "low-costs interventions from everyday household items".

Some examples include: painting streets vibrant colors and eye catching patterns that mark pedestrian walkways or bike lanes, setting out chairs or flowerpots to block off busy intersections and other creative ways to introduce people friendly areas and 'do it yourself' safety precautions. The "calming zone" experiment in Santiago gave 85% of people a greater sense of community in their area simply because they had contributed to the efforts. This experiment had such a positive impact on the neighborhood the city of Santiago decided to make this a reality and created a permanent traffic calming zone which was built by 150 volunteers made up of activists, citizens, and community organizations. (source)

Similarly, Barcelona, Spain, has created a plan to gradually introduce superblocks to the city - 440x440 yard block (9 square blocks, which is equivalent to 805 square meters) that restricts traffic from entering the block. Cars that do enter must remain at a speed limit of 6 mph (10 kph) within the the superblock and park in designated areas underground.

Opening the area to pedestrians, cyclists, markets, festivals, and parties making this a much more friendly, enjoyable community area. Vitoria-Gasteiz, another city in Spain, has already had great success with superblocks, adding a significant amount of pedestrian space. This also contributed to a reduction in noise and air pollution in the superblock, almost cutting both in half. (source 1, 2)

The Cheonggyecheon Restoration Research Group in Seoul Korea made great improvements to this once cold, vehicle ridden, heavily polluted area.

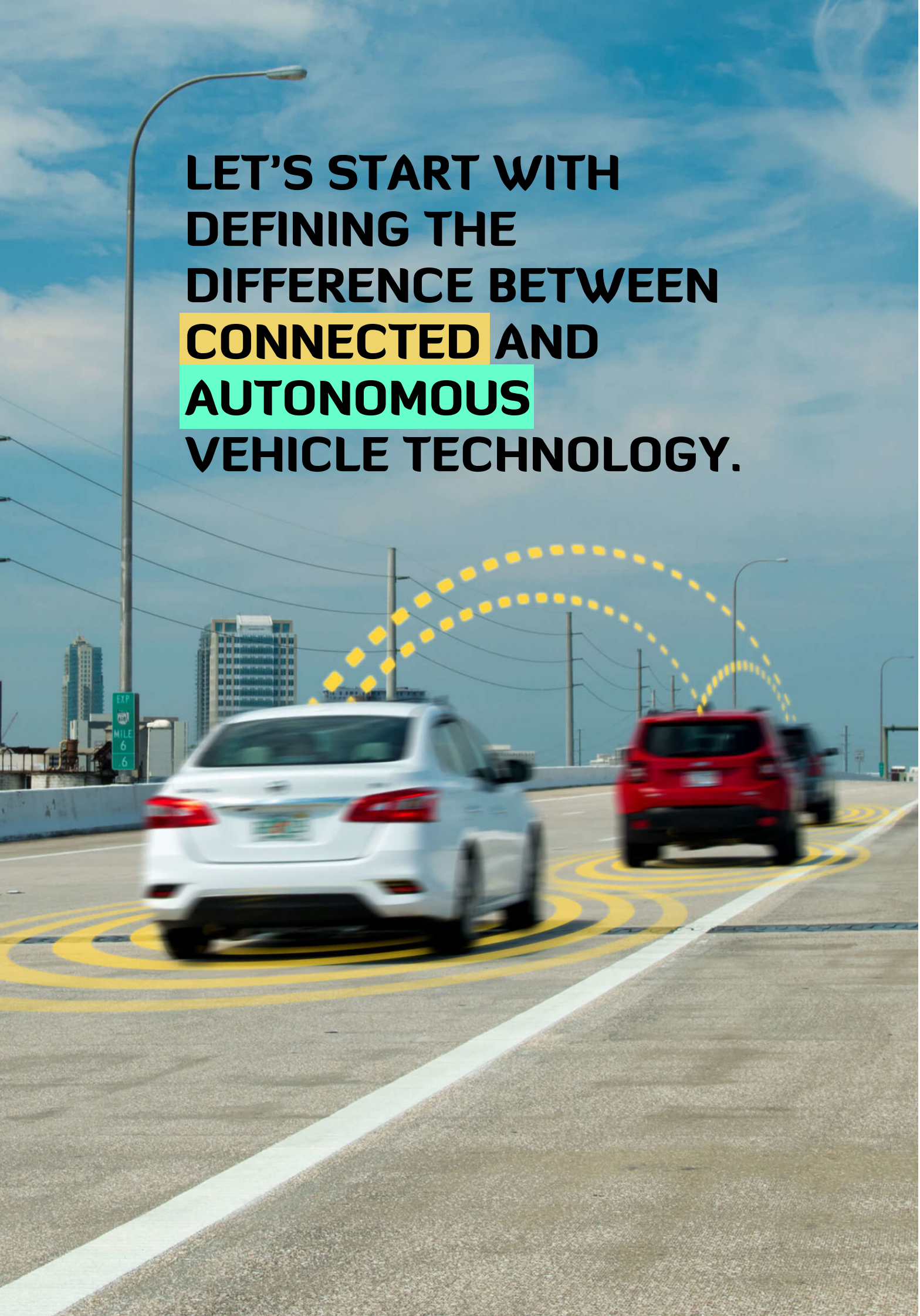
The non-profit group transformed the Cheonggyecheon river into a common area for pedestrians, cyclists and various other activities. The busy elevated highway that ran through downtown Seoul, covering the river was at one point, helping to transport 170,000 vehicles a day causing deterioration to both the road and the ecological conditions of the river.

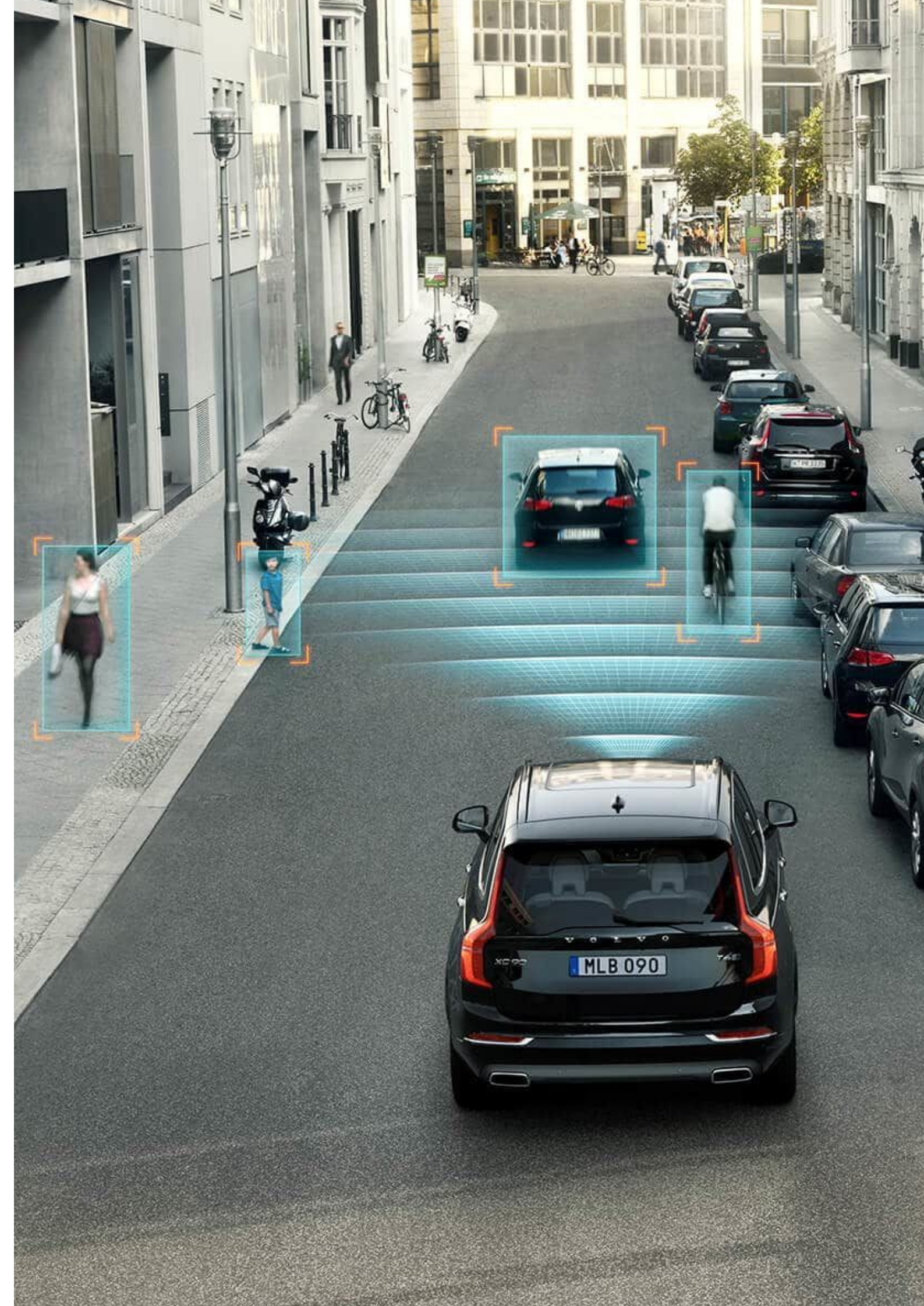
Since 2005, when the restoration was completed, there has been a quick recovery in the river's ecosystem, which went from only 98 species to 864 in a little over 5 years. In addition, the restoration reduced small air particulate matter by almost half, reduced urban island heat effect (an effect of climate change and greenhouse gasses) and now acts flood protection area. (source 1, 2)

These are just a few examples of Vision Zero at work. Now, obviously these are not long term solutions because VZ operates within the outdated trade based system. However, I wanted showcased this to point out that a paradigm shift can occur with the efforts of just a few people. Also, it is important to note that in most cases, changes were initiated by "regular" people and brought about through sharing ideas, and cooperative, voluntary work without profits involved.

So, what are some long-term solutions to the global transportation woes, you ask?

In a previous TROM ebook, titled "Automated Autonomous World", we present a lot of technology and ideas that currently exists in our present day society. Although I do recommend reading the entire book, we will specifically focus on the Transportation section in reference to this subject for now. This TROM ebook was written in 2014 and it is now 2017, so I will give some highlights of where we are today with our technological transportation capabilities.


LET'S START WITH
DEFINING THE
DIFFERENCE BETWEEN
CONNECTED AND
AUTONOMOUS
VEHICLE TECHNOLOGY.


VOLVO
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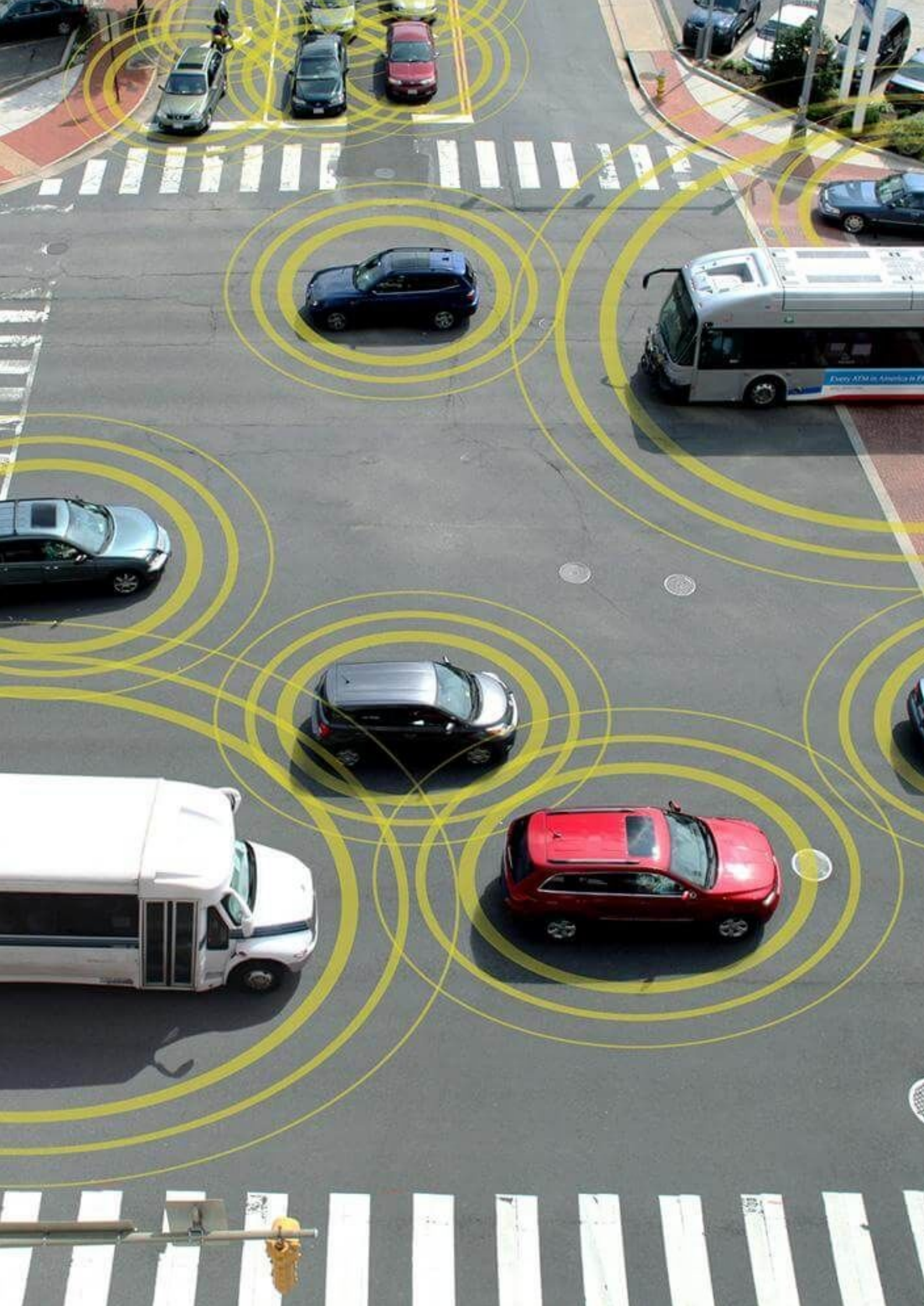
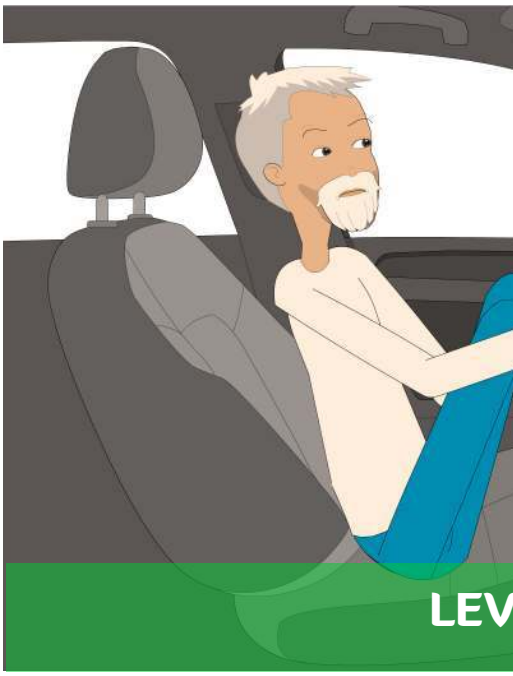
Connected vehicles systems, known as Cooperative Intelligent Transportation Systems (C-ITS) or Vehicle-to-Everything [V2X] allow cars to communicate with one another, the infrastructure, pedestrians and cyclist through wireless connectivity similar to wifi.

This technology can be used to improve vehicle safety through hazard warnings and also to improve vehicle efficiency and commute times. For example, if there is an object blocking a lane that is difficult to see from your position in the road, the C-ITS will send a notification to the autonomous vehicle and it will safely avoid the object and prevent a crash. This system can also give your vehicle weather warnings in situations where the roads may not appear to be dangerous but should be avoided and can notify an emergency medical system crew when necessary.

In order for full autonomy to be put into proper use the infrastructure must be updated, using V2X technology. In addition, connected vehicles will be a necessity as we segway out of human operated vehicles and into full autonomy since there will be a mixture of both types of vehicles on the roads.



NOW, LET'S DISCUSS AUTONOMOUS VEHICLES. FIRST OF ALL IT IS IMPORTANT TO NOTE THAT THERE ARE SIX LEVELS OF AUTONOMY THAT ARE RECOGNIZED WORLDWIDE (SOURCE)



The human driver does everything.

An automated system on the vehicle can actually conduct some parts of the driving task, while the human driver continues to monitor the driving environment and performs the rest of the driving task.

VEL 1

LEVEL 2

An automated system on the vehicle can sometimes assist the human driver conduct some parts of the driving work.

An automated system can both actually conduct some parts of the driving task and monitor the driving environment in some instances, but the human driver must be ready to take back control when the automated system requests.

LEVEL 3

LEV

An automated system can conduct the driving task and monitor the driving environment, and the human need not take back control, but the automated system can operate only in certain environments and under certain conditions.

EL 4

LEVEL5

The automated system can perform all driving tasks, under all conditions that a human driver could perform them.

FOUR OF THE MOST COMMON TYPES OF SENSORS USED FOR NAVIGATING AUTONOMOUS VEHICLES:

Lidar - (light detection and ranging) is the use of laser light to identify objects and measure distances, specifically long distances (up to 200 meters) but not so great for close range. Works well in light or dark conditions but it has trouble detecting objects in the fog, rain, and dust because it uses light wavelengths.

Radar - uses radio waves to identify objects and determine velocity and angles and works well in the snow, fog, rain and close range but is low resolution. This means that radar has trouble detecting small or distant objects.

Ultrasonic - works well in close range and in all types of weather. This system is similar to the way bats echolocate sending ultrasonic soundwaves to determine distance by how long it takes for the waves to return. However, this technology does not have the long distance range that Lidar or Radar have.

Passive Visual - uses cameras in combination with sophisticated image recognition algorithms to understand what cameras are seeing. Although this system has better resolution than other sensors - can detect color, contrast, and has long range - it only works well in good light conditions.

These sensors may be used in combination with one another and are constantly evolving due to the rapid development of this technology.

OLI

Olli, an electric shuttle made of 3d printed parts (source) is equipped with a cloud-based cognitive computing platform, which is an AI system that is capable of understanding, reasoning, learning and interacting with humans (source). This is done by quickly retrieving data from the Internet of Things (IoT) - a computer network that connects ordinary items to make them "smart". Olli uses GPS, Lidar, and optical cameras capable of constructing extremely accurate 3-D maps of local areas.

This electric shuttle is accessible through a mobile app, has connected vehicle technology and is fully autonomous (level 5). (source)

Local Motors (the company that produces Olli) uses open innovation from crowdsourcing and co-creation via their community platform. Local Motors also uses Direct Digital Manufacturing which allows for parts to be produced directly from a CAD file. This type of production is extremely efficient with way less waste and is easily customizable. This means that specific features can be added to aid the blind, hearing impaired and those with physical and cognitive disabilities. (source)

Everything is produced in microfactories which is a "physical operating space, designed for rapid prototyping, modular experimentation, and small-batch manufacturing of products." In 2016, Olli hit the public roads in a pre-pilot deployment in National Harbor, MD and is in the process of moving into other parts of the world such as Miami-Dade, Las Vegas, Berlin, and Copenhagen.

MCITY

University of Michigan Transportation Research Institute developed the University of Michigan Mobility Transformation Center (MTC), which is a public-private partnership to support research and development of autonomous vehicles. MTC developed MCity which is a 32 acre (~130,000 m2) proving site, with about 16 acres (~65,000 m2) of road and traffic infrastructure with two, three and four lane roads. This is a safe, controlled environment that mimics real world situations involving pedestrians in crosswalks, intersections, underpasses, traffic lights, street signs and signals, and so on.

MCity is specifically designed to test, observe and shape the behavior of connected and autonomous vehicles. In addition, MCity plans to deploy 2 fully autonomous electric shuttle buses, which seats up to 15 people and can drive at top speeds of 45 mph (72 km/h). (source) These two level 5 shuttles will drive a 2 mile (1.6 km) route on campus as part of a research project that will allow developers to gain insight for new opportunities and challenges as well as show how humans interact with this type of technology. The shuttle uses a combination of Lidar, cameras, GPS, and an odometer to measure the displacement and the wheel speed to estimate the velocity and confirm its position to help navigate the vehicle.

UDACITY + NVIDIA

Udacity is an online university which was born out of an experiment where two University of Stanford professors posted their "Introduction to Artificial Intelligence" course online for free available to anyone. More than 160,000 students in more than 190 countries enrolled. Soon after, Udacity was formed with the focus of providing real world, relevant education. One way of doing so, is by providing a series of nanodegrees (an online certification that focuses on basic programing earned within 6-12 months - source).

One in particular is the self-driving car engineer scholarship program. A major goal of this program is to build the world's first open sourced, self-driving vehicle through a series of challenges which include: 3D model for camera mount, using deep learning to predict steering angles, image-based localization, and self-driving car Android dashboard.

One of the key factors in the field of developing safe, reliable, autonomous vehicles is the use of deep learning. NVIDIA, one of the companies that has partnered with Udacity is also an online institute focused on end-to-end deep learning and a pioneer in developing graphic cards (video cards). NVIDIA developed a program to teach a vehicle how to steer the wheel completely on it's own. Using a Convolutional Neural Networks AKA ConvNets or CNNs, which are extremely effective in areas of image recognition and classification such as identifying objects, street signs, and even faces. The NVIDIA team was able to train the CNN, called DAVE-2, to map raw pixels from a front facing camera mounted to the windshield of a car which sent steering commands to the vehicle.

This type of end-to-end system needs very little training data from humans and can learn to drive in traffic on local or highway roads, with or without lane markings and in areas with unclear visual markings such as parking lots and unpaved roads. In addition, tests prove that this system does quite well in all types of weather conditions. DAVE-2 learns by taking raw input in the form of camera imagery then produces direct steering commands without using Lidar. This will eliminate heavy costs (in terms of resources and energy) of such equipment. Once Udacity fully develops this technology the goal is to implement an end-to-end solution, and release that to the world for free.(source) This is very important because it removes intellectual property associated with this technology, thus allowing anyone to continually build off of this and make improvements over time.

WAYMO

What about a self-driving vehicle without a steering wheel? Google's self driving car, which was featured in the TROM ebook mentioned earlier, has since been rebranded as Waymo. The autonomous car developers recently announced that they have tracked over 3 million miles (~5 million km) on public roads and 8 million miles (~13 million km) in simulation and was the first to put a fully driverless vehicle at level 5 autonomy without a police escort onto public roads.(source 1, 2, 3)

The autonomous vehicle company is also working on making self driving technology that is much less resource hungry by creating their own Lidar system. This has proven to be very reliable as their technology becomes more advanced. When you compare Waymo's number of disengagements (when a human has to take over) from the past two years, the number has dramatically decreased from 341 in 2015 to 124 in 2016. Also, Waymo is participating in an early rider program. They disbursed a fleet of 100 minivans where volunteers can use the autonomous vehicles for everyday errands in exchange for feedback.

LYFT

Ride-hailing service Lyft just announced that they, along with autonomous vehicle tech company Nutonomy, have integrated self-driving vehicles into their fleet in Boston, MA (2017). (source)

This will help to implement car sharing or Mobility as a service (MaaS) (source) on a much larger scale.

This is an important step to help transition into full autonomy because people won't need to buy their own autonomous vehicle, they can simply use a rideshare service instead. Also, this will help to eliminate congestion on the roads and clear out land currently being used for parking/storing vehicles as well as cut back on environmental pollution and exploitation.

LILIUM

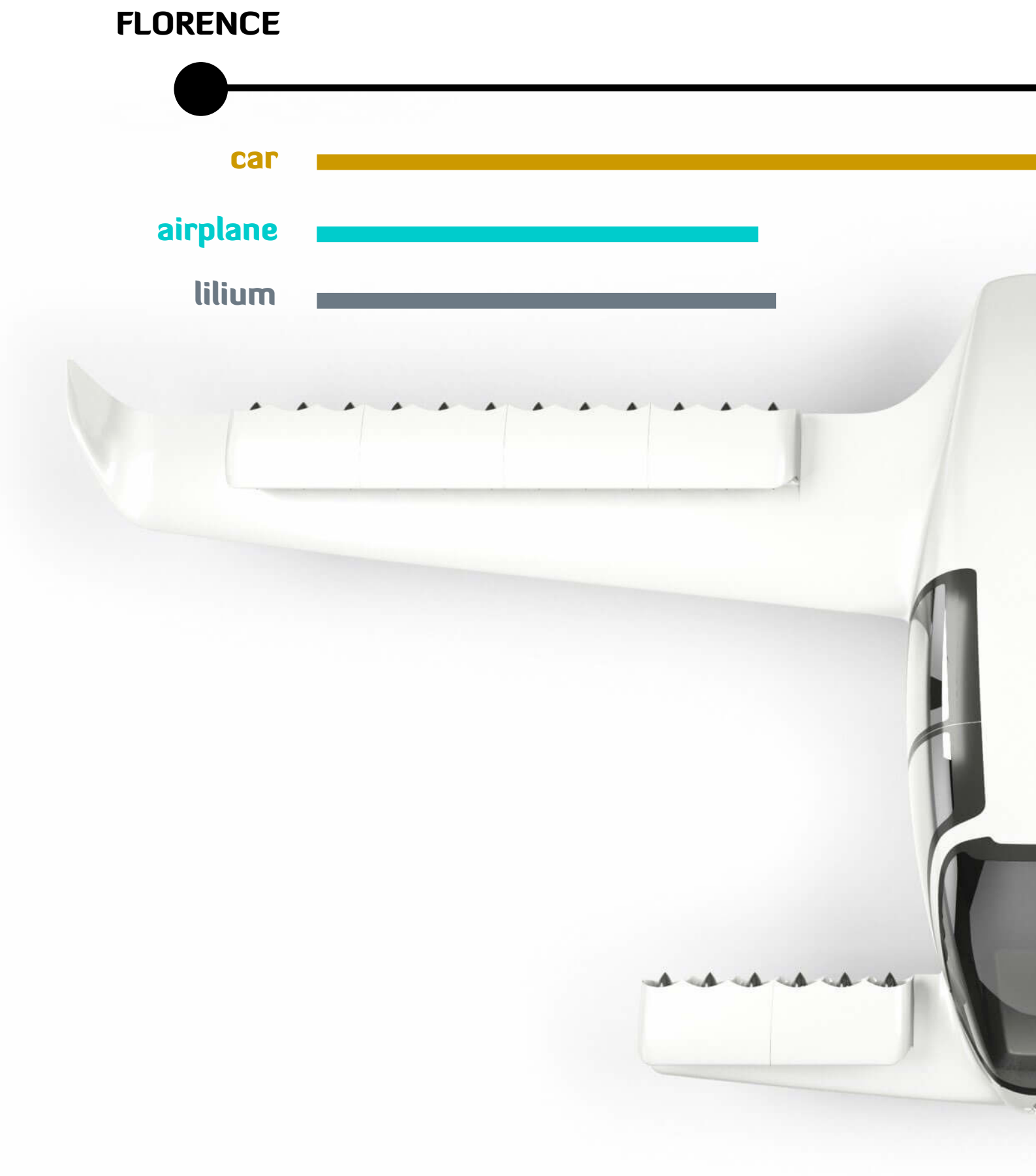
The next level of transportation is already underway in the form of electric flying vehicles known as VTOL (vertical takeoff and landing aircraft); which combines the vertical lift and landing of a helicopter, yet flies like an airplane. While VTOL is not a new concept; low maintenance, low noise, electric jet engines with zero emission and high speed VTOL is. Especially when being used for everyday transportation needs in the form of an on-demand air taxi service that can be summoned via mobile app.

Lilium, is a company that has already successfully tested a 2 seat, pilotless jet and has plans to test a full size version that seats up to 5 people by 2019. The Lilium jet will take flight as a fully functioning vehicle ready for passengers by 2025.

However, it will be operated by a human pilot using simplified manual controls and may move into autonomy but there are no specifications yet. (source 1, 2) This technology can reduce an hour commute down to 15 minutes. Since the jet engines only have one moving part and the system has a high redundancy (in case of single engine failure) they are super reliable and efficient. This also helps to cut back on the resources needed to power the jets.

Lilium jets are expected to reach speeds of 186 mph (300 km/h) traveling as far as 186 miles (300 km) in one hour on a single charge. (source 1, 2) This is much faster than traveling by car or train but not quite as fast as a commercial airplane nor can it travel as far as any of the aforementioned.

To give you an idea a VTOL jet can transport you from Florence, Italy to Rome in about an hour versus 3+ hours by car or 55 minutes by airplane. (source 1, 2)



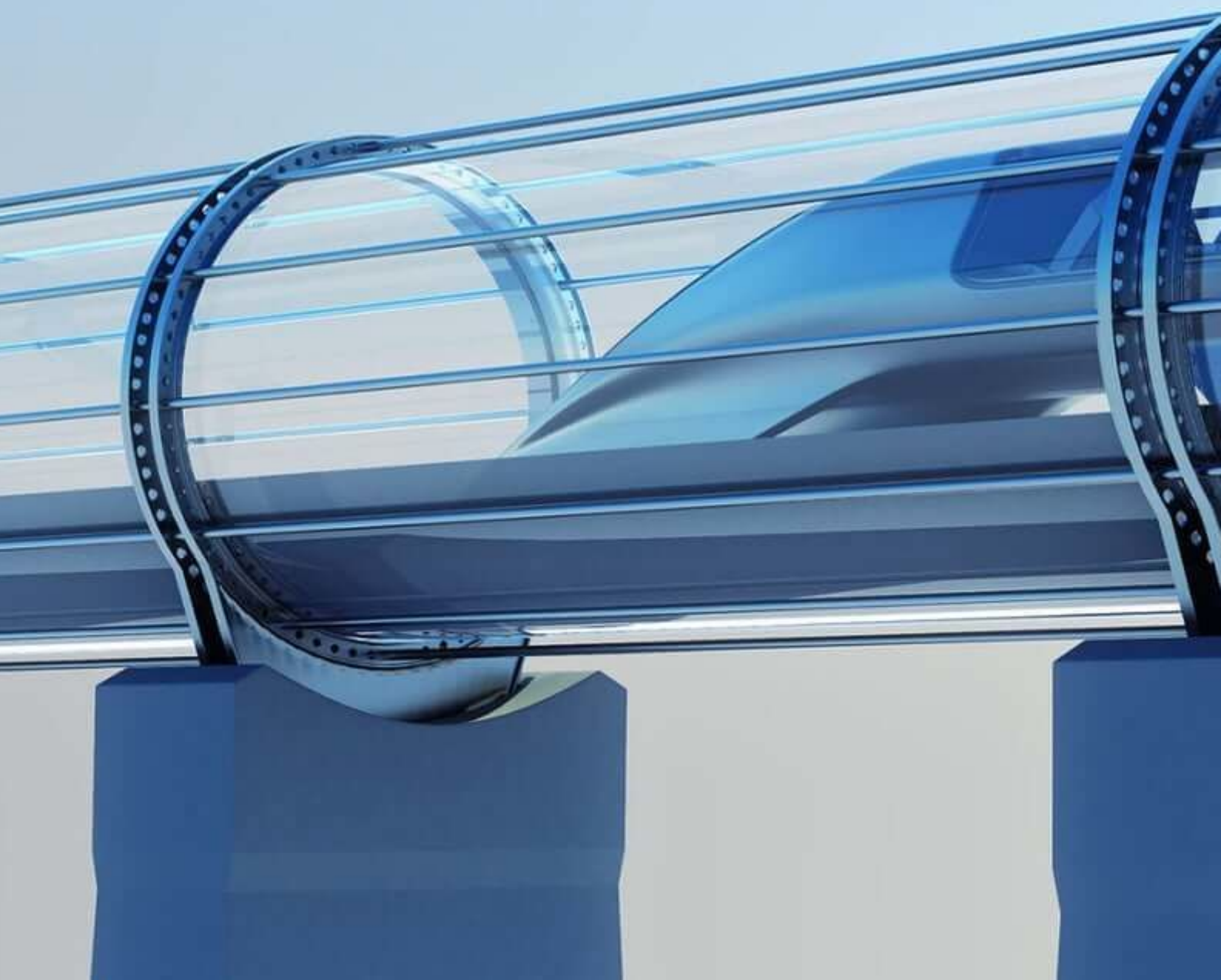
Much like the autonomous vehicle development, flying cars are quickly becoming a reality. Research teams and developers, including those at MIT, Uber, and NASA are working diligently to get this technology off the ground. Literally ;)

ROME

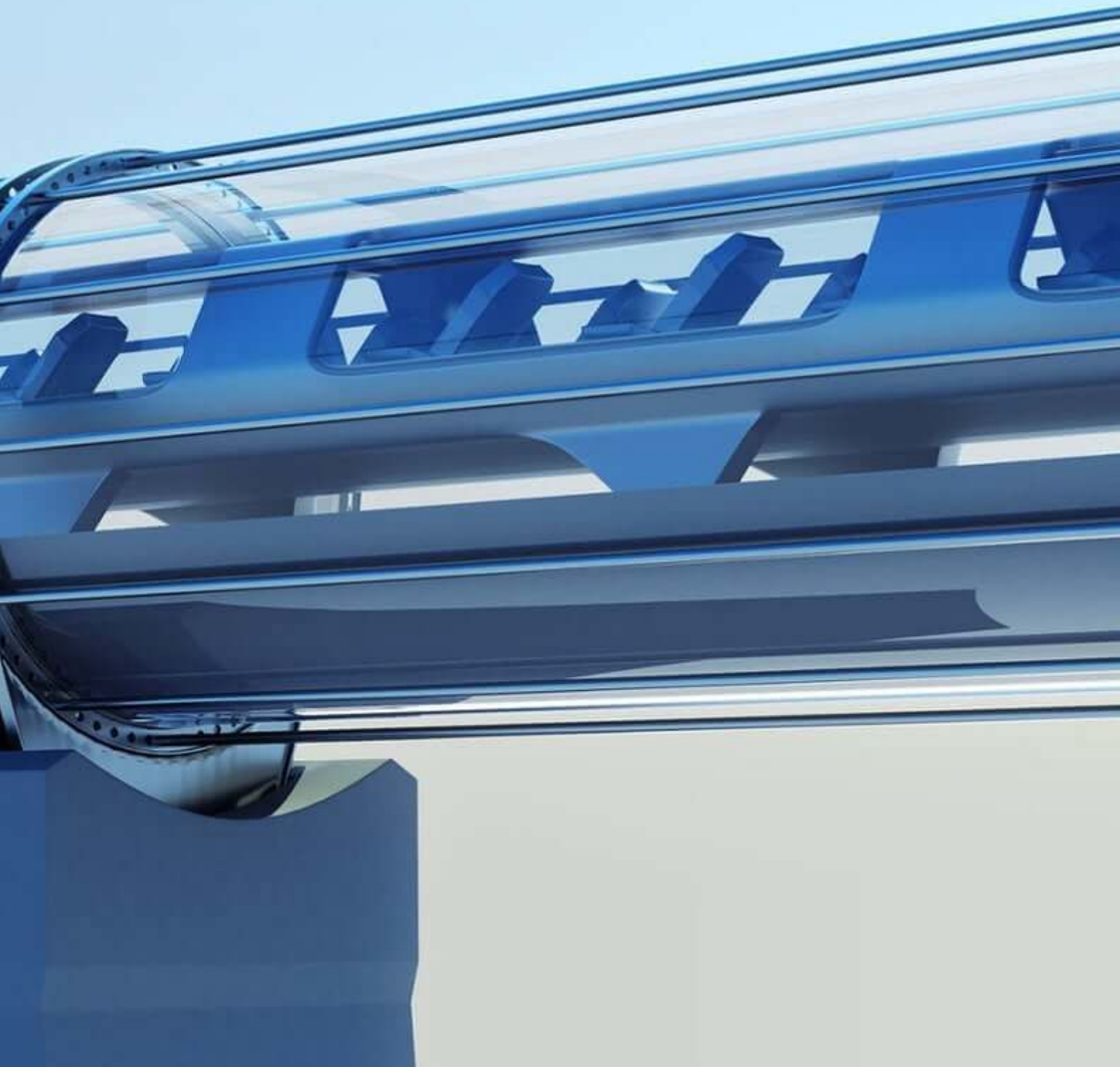
HYPERLOOP

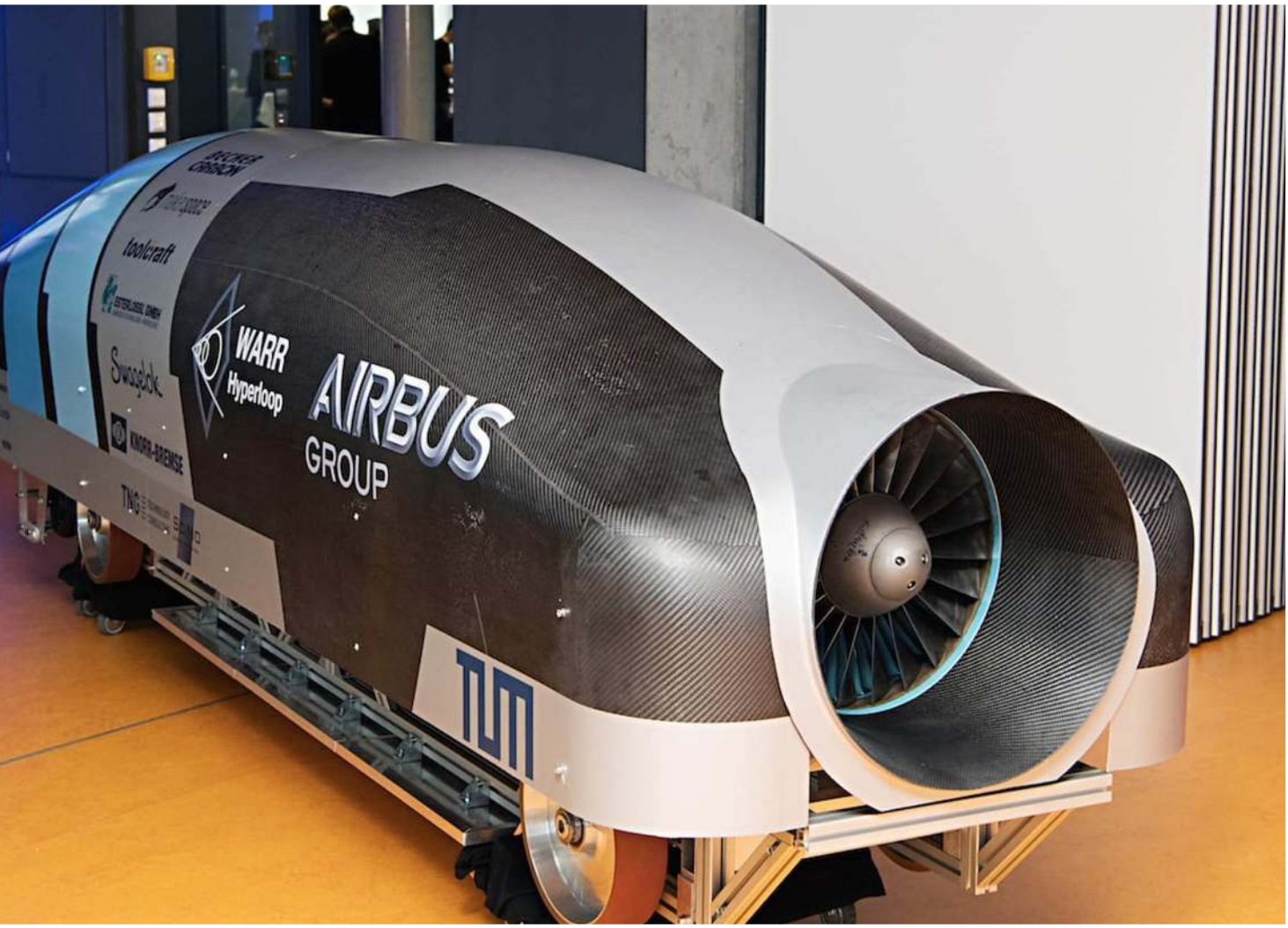
The Hyperloop mass transit system is under development and swiftly making its way into the real world as well.

Elon Musk first proposed this concept in 2013 in opposition to the bullet train that is currently being built in California. From the beginning this has been an open source project.



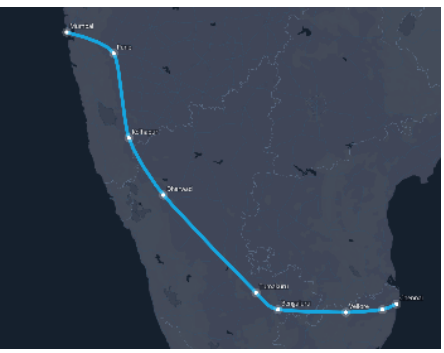
SpaceX (Musk's company) is not currently in development of any Hyperloop systems. Instead, SpaceX encourages students, innovators and engineers from all over the world to enter into a series of competitions to further bring this concept to life.

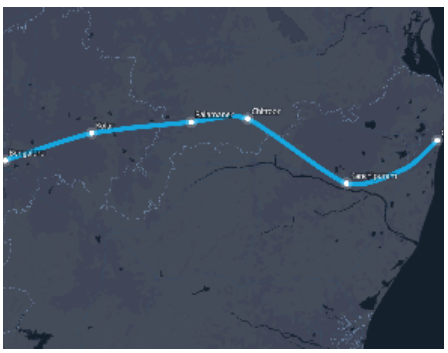
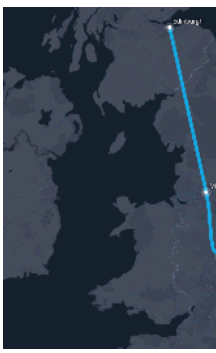




Some student innovations include: creating a pod that has a fail-safe brake system; creating two arrays of neodymium magnets (a form of magnetic levitation) to keep the pod floating rather than using traditional air jets.(source); a pod design that reached top speeds of 217 mph (350 km/h).(source)

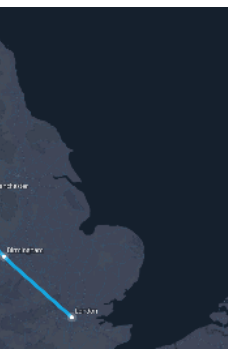
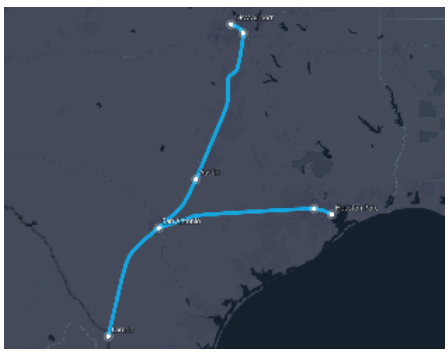
In addition to the SpaceX student challenges, there are numerous startup companies working to bring the Hyperloop into the real world.

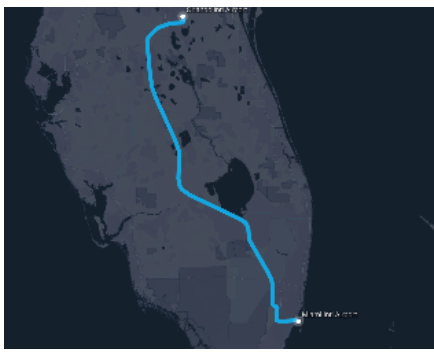


A company called Hyperloop One, which developed an aerodynamic pod that reaches speeds of 200 mph (322 km/h) also held a challenge for proposals to build Hyperloop networks connecting cities and regions all over the world.

Out of 2600+ teams it was narrowed down to 10 routes in 5 different countries:



MAGLEV TRAINS

Traditional Maglev train systems aka active maglev, aren't exactly feasible in today's society since the mechanics are quite complex and they require constant power for the chilled, superconducting, electromagnets on the train. The resources for this type of mass transit is very costly in a trade based society. Also, politics gets in the way of anything that makes the oil/car industry obsolete, hence the reason it hasn't caught on globally.

However, in a post trade society, where we no longer have to rely on money for resources and everything is built for maximum efficiency, maglev trains would be ideal since they are self-sustainable and require much less energy.

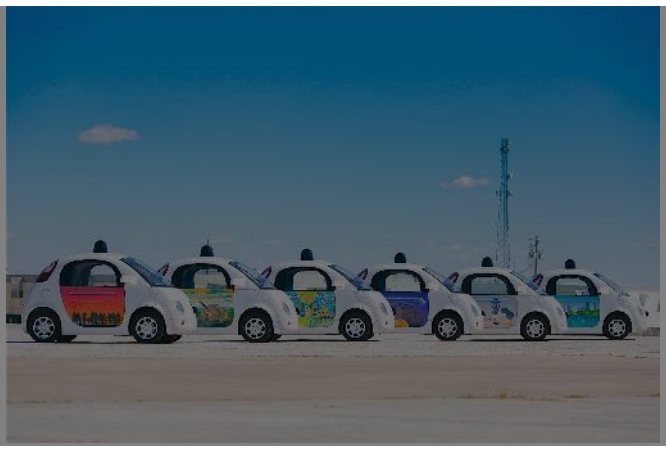
HYPERLOOP + INDUCTRACK

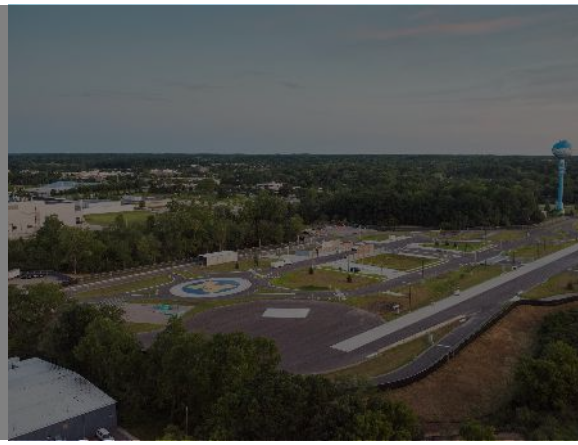
Passive maglev, which is a lesser known type of magnetic levitation requires very little resources to create and maintain. This type of technology uses a combination of wire in the track and permanent magnets in the train pod to create levitation. Unlike traditional maglev systems that require a lot of resources to build the tracks, passive maglev systems (aka Inductrack) are passive in that it uses no superconducting magnets or powered electromagnets.

Instead it uses permanent room-temperature magnets, so it doesn't require chilling. Permanent magnets create their own continual magnetic field that levitate the pod. Again, this requires far less resources and is feasible even in a for-profit system.

This technology is now being explored by another startup company, called Hyperloop Transportation Technologies.

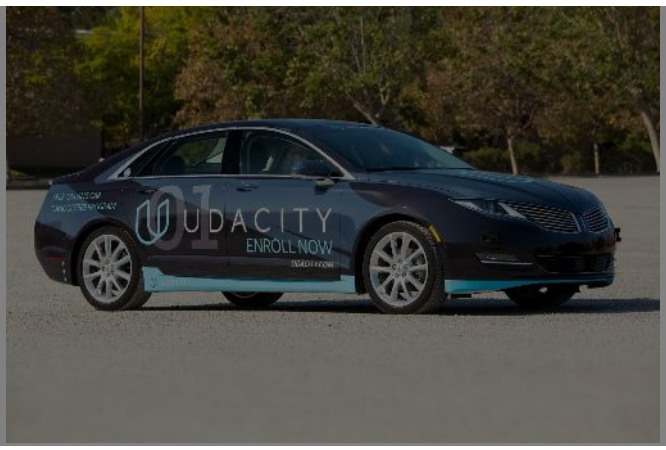
So much awesome technology exist today in the field of autonomous driving and its rapidly evolving each day. So much so, that I couldn't even fit it all into one article. Everything from vehicles like Olli, that are level 5 autonomy being deployed in cities all over the world; incredible state of the art test grounds like MCity that simulate the real world, allowing developers to gain insight and create precise technology for connected and autonomous vehicles; to Mobility as a Service on a global scale. Maglev trains, Hyperloop systems, and flying taxis that all once seemed to be something out of a sci-fi story are now a reality that even the most uninspired can imagine.

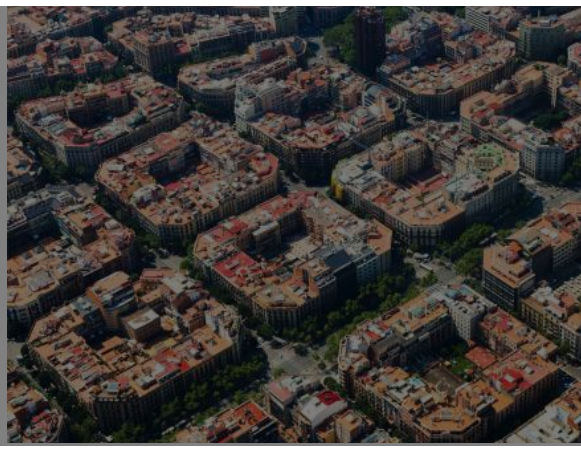




The technology that exists today and the possibilities it presents are very exciting. It seems that we are highly capable of creating an efficient, clean energy, safe transportation system that every human on earth can benefit from. We have the resources and the technology needed to do so.

However, as long as we remain bounded by this for-profit, trade based system we will continue to see the problems that come along with it. Regardless of how amazing fully autonomous, connected vehicles will be and how much this technology will improve our lives.



As long as we are all forced to continue playing this trade game, progress will remain slow and access will be limited.

Having so many different types of technology that are "owned" by patent laws with many different types of infrastructure and driving rules create the need for different legalities and regulations which will still be chaotic, unsafe and inefficient. In a trade based system new ways of implementing policies and reasons to charge people for insurance will continually be created.

Furthermore, as long as companies control the development of technology and the need for ever-increasing profits exist, we will continue to experience: waste and environmental destruction, marketing schemes that do not live up to their promise, induced demand, planned obsolescence, physical/intellectual property, law enforcement, tedious human labor roles and so on. It is also important to note that forms of connected infrastructure are currently in use. However, they aren't simply used for safety and efficiency, but mainly for the sake of profits.

For example, automatic number-plate recognition (ANPR) uses closed-circuit television (CCTV) to scan license plates and collect data for toll roads and parking lot so that they can bill you later, or in some cases collect payment automatically. In addition ANPR is used by law enforcement agencies all over the world to help collect data on suspected criminals. Traffic enforcement cameras are used to ticket people who are speeding, making an illegal right turn at a red light, driving in a bus lane, or high occupancy vehicle lanes. The camera will take a picture of you (or whoever is driving the vehicle) and your license plate and then send you a traffic ticket in the mail, yet it is not used as a safety precaution.

Also, there are certain risks that connected vehicles pose in our current day system that would not be an issue in a post-trade society. A major issue is easy access to personal data that will be collected and shared by companies and from driver to driver.

Our personal information is compromised, collected, and sold in many unsuspecting ways by private enterprise today via the internet.

This is known as data brokerage.(source) Companies like google and facebook are notorious data brokers and they make billions each year by collecting personal information, such as: name, address, web history, etc then they sell the information to other companies.

Similarly, connected vehicle technology is an easy way for data brokers to access personal information and this will lead to more "hidden" markets where profits reign supreme and yet, another shred of user privacy will be lost.

Other potential risks include, cyber attacks on many levels, net neutrality issues (one connected car company may be able to pay for the upper hand in the market over their competitors or it could mean slower services for the less fortunate), Cross-border use of connected cars (basically each region can decide on deployment of applications and services on its territory). Therefore your connected car services may not work outside of the region in which you live. Not to mention all of those who live in poverty that will not get to experience the benefits of this technology, remaining in unsafe and outdated conditions restricted by imaginary profits.

As you can see there are many issues to overcome as long as we remain in this irrational system.

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